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STRESS INTENSITY FACTORS AND CRACK INTERACTION IN ADJACENT HOLES

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13. ABSTRACT *(Maximum 200 words)*

In this analytical investigation, stress intensity factors, K, are calculated for oblique part-elliptical through cracks nucleating and growing from an array of collinear holes subjected to remote tension, bending, and pin loading. The finite element method is used with model validation through comparisons to known stress concentration factors solutions. The three-dimensional virtual crack closure technique (3D VCCT) is used to calculate the new K solutions. This work was motivated by the need to predict fatigue crack growth in transport aircraft fuselage lap-splice skin joints. Fatigue crack growth of adjacent through cracks with oblique crack fronts can now be predicted using the results of this investigation.

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stress intensity factor, part-elliptical, finite element analysis, virtual crack closure technique, through crack, oblique front, crack interaction.

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a	crack depth	[mm]
b	width of Finite Element Geometry	[mm]
h	height of the Finite Element Geometry	[mm]
K	Stress Intensity Factor	[MPa√m]
r	radius	[mm]
t	thickness	[mm]
u, v, w	displacements in Cartesian coordinates	[mm]
x, y, z	Cartesian coordinates	[mm]
β	geometry correction factor	[-]
σ	Unit Stress	[MPa]
c_1	front (faying) surface crack length	[mm]
c_2	Penetrated (free) surface crack length	[mm]
c^*	front crack length at which crack interaction influences the crack growth behavior	[mm]
l_{lig}	intact net section of sheet material between cracks growing towards each other	[mm]

1. Introduction

Metal fatigue is still a major concern to aircraft designers. Failures occurring as early as 1954 showed the danger of fatigue crack growth in fuselage structures in general. The Aloha Airlines[1] accident in April 1988 showed fatigue cracking and subsequent unstable fracture in fuselage riveted lap-splice joints. Recent investigations of the behavior of cracks in lap-splice joints provided information on the characteristic crack shape found in aircraft riveted lap-splice joints. In reference [2], tests were done using thin sheet material 2024-T3 clad aluminum alloy with a centrally located hole subjected to remote tension and bending. This research, in addition to the analytical work, showed the effects of bending and bearing stress on the fatigue life and crack-front shape development. An extension to this research is performed by again testing thin sheet 2024-T3 Clad aluminum alloy but with two adjacent holes subjected to remote tension and bending[3]. The intent of the current investigation is to show the degree of crack interaction between two oblique through cracks growing toward one another from adjacent fastener holes.

Initiation of cracks in lap-splice joints usually takes place as corner or surface cracks near the rivet hole at the faying surface of the joint. From this point, the cracks continue to grow due to cyclic loading towards the free surface of the joint, opposite the initiation site. Once the crack grows through the sheet thickness, it continues to grow as a part-elliptical through crack due to the applied loading condition. The primary loading condition is a tensile membrane stress (hoop stress) caused by cabin pressurization, see Figure 1. The hoop stress creates a bending stress due to the joint eccentricity and bearing stress due to load transfer through the rivets. The part-elliptical oblique crack shape is maintained throughout the life of the crack even when adjacent cracks start to interact with one another. This interaction causes an increase in the crack growth rate ultimately leading to crack link-up at the faying surface.

In the laboratory, coupon sized fatigue test specimens subjected to similar loading showed similar crack shapes as in-service cracks. These crack shapes were also observed in earlier tests[2,4]. In addition, earlier research also showed that the three-dimensional virtual crack closure technique

was a useful tool for calculating stress intensity factors for crack geometries and load conditions commonly found not only in laboratory test specimens, but also from in-service experience. The same procedure as in ref [2] is used here for calculating the new K solutions. The K calculations are done for complex loading conditions representing axial tension, secondary bending and pin loading. In reference [5], three different pin loading distributions (concentrated, cosine and cosine^2) were used to investigate the effect of the pin load distribution on K. As a result, the cosine^2 distribution appears to be the most appropriate and is thus used here.

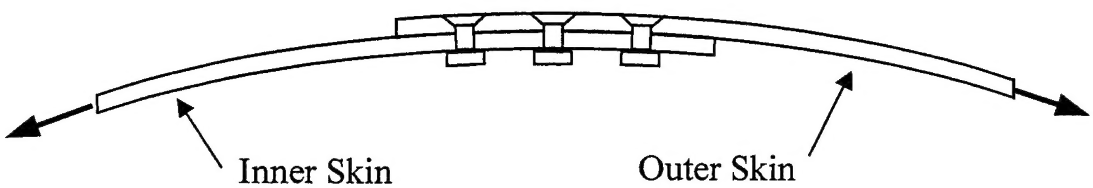

Figure 1 Typical lap-splice joint in aircraft fuselage

2. Finite element analysis

A variety of methods are available to obtain stress intensity factors for cracked three-dimensional bodies, most methods require an experienced analyst. Stress intensity factors can be determined using finite element analysis by either direct or indirect methods[5]. The 3D VCCT is an indirect method which means that the nodal information, displacements and forces, are used to obtain the energy release rate that is then used to calculate K. Using the 3D VCCT avoids most of the difficulties encountered by using other methods, e.g. neither singularity elements at the crack front nor creating elements normal to the curved crack front are required. The global dimensions of the model used are shown in Figure 2. By making use of the symmetry planes, only a quarter of the plate is modeled using 7,712 eight noded solid isoparametric elements with 9738 nodes resulting in 29,214 unconstrained degrees of freedom. Since the mesh in the vicinity of the crack front does not require special elements, only one finite element mesh is used for all K calculations. Further information on the procedure used can be found in reference [5].

To make use of the symmetry conditions at x = 0, the *u* displacements are constrained and at y = 0, the *v* displacements are constrained. Where *u*, *v* and *w* are the displacements in the global (x, y, z) directions. At x = b an additional symmetry condition is applied, all *u* displacements are constrained. With this boundary condition, the quarter model represents an infinite array of holes. When applying a remote unit stress ($\sigma = 1$) at y = h, the *u*=0 constraint at x = b introduces a σ_{xx} since the fixed nodes at x = b restrict the Poisson contraction in the xy-plane. The σ_{xx} gives a similar stress situation as was presented by Schulz for a 2-dimensional infinite width plate with an array of holes.[6] Furthermore, Broek stated that for an array of collinear cracks, the same stress field at the edges could be found.[7] A finite element analysis showed only a small difference between the 2D analytical solution by Schulz and the present solution. A small difference is to be expected when comparing the solution for small straight through cracks at the bore of the hole since the crack interaction effect is negligible. Three different loading conditions are applied, an axial unit tensile stress (at y = h), a remote unit bending stress (at y = h) which varies linearly through the thickness, and a pin load (cosine squared pressure applied to the bore of the hole).

The dimensions shown in Figure 2 are h = 76.2 mm, b = 12.7 mm and r = 2.54 mm. The height h = 76.2 mm is chosen to eliminate any finite height effects.[8]

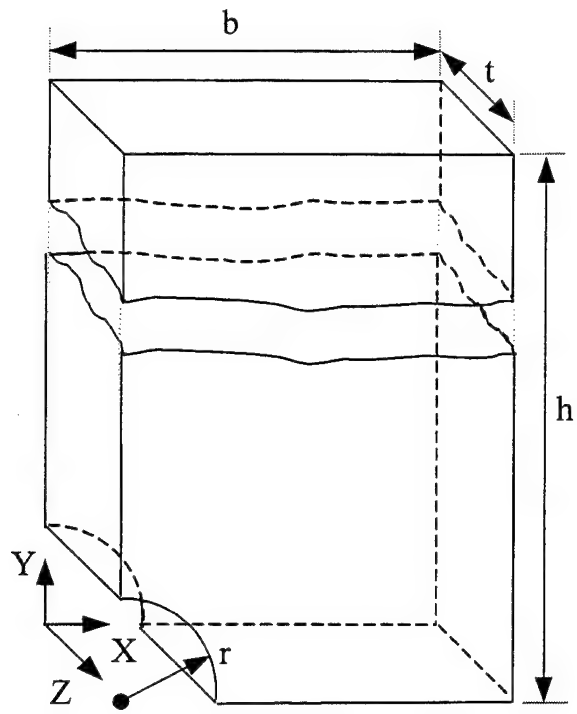

Figure 2 Finite element model geometry

3. Analytical Investigation

The stress intensity factors calculated here are for crack shapes similar to those used in reference [2], see Table 1. The loading conditions used in ref [2] are also used here. By choosing the same crack shapes as used in ref. [2], see Figure 3, comparisons to the newly calculated K's are simple.

Table 1 Crack Shape Geometries

a/t	1.05, 1.09, 1.13, 1.17, 1.19, 1.21, 2.0, 3.0, 5.0
a/c_1	0.3, 0.4, 0.6, 0.8, 1.0, 2.0, 5.0, 10.0
r/t	1.0, 1.27, 1.5, 2.0, 2.5

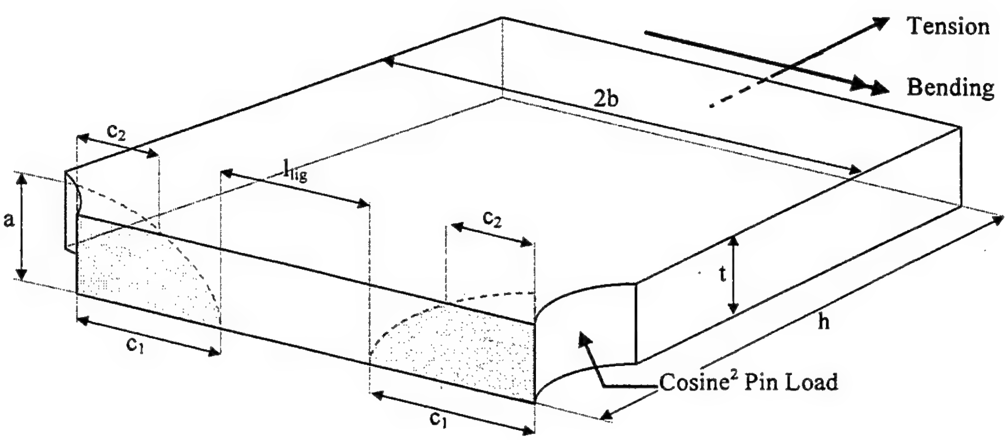

Figure 3 Crack shape showing a, t, c_1 and c_2. Where l_{lig} represents the remaining intact net section of material between cracks growing towards each other $l_{lig} = 2 \cdot (b - r + c_1)$. Tension, Bending and Cosine^2 Pin Load are applied unit stresses

The plane strain relation is used when calculating K from the strain energy release rate. The calculated K is then normalized as shown in Eqn. (1) to yield the geometric correction factor, β.

$$\beta = \frac{K_I}{\sigma\sqrt{\pi c_1}} \tag{1}$$

K's for all load cases are normalized in this manner where σ is the applied stress, and c_1 is the crack length at a given z/t. Note, since the model represents an infinite sheet, no finite width correction is included in the normalization of K.

The interdependency of the crack shape parameters a/c_1, a/t, and r/t and their influence on the β solutions make it very difficult to summarize the prevailing trends of the β solutions. For a variable crack shape, a/c_1, and a constant a/t and r/t, Figure 4 shows a trend that can be found for all other r/t and a/t values.

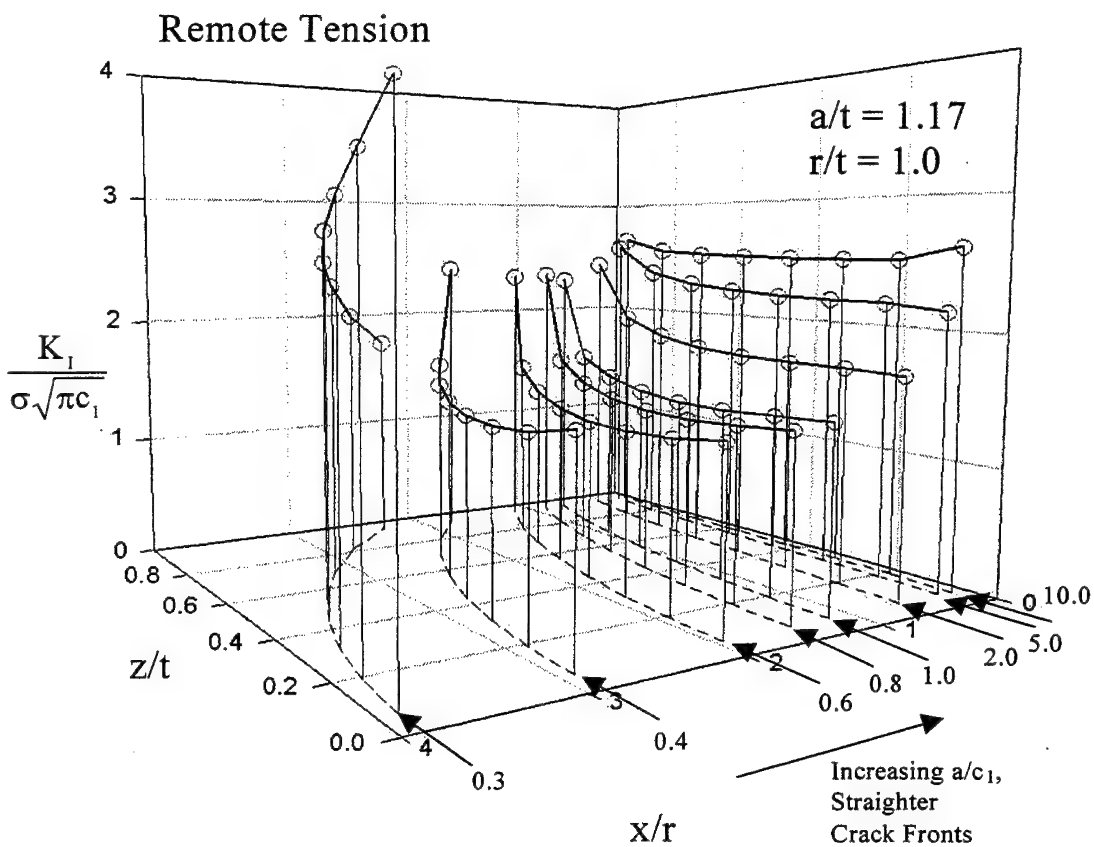

Figure 4 Effect of changing a/c_1 on β for a/t = 1.17 and r/t = 1.0, for infinite sheet with an array of holes

For an increasing a/c_1, constant a and decreasing c_1, the crack fronts are closer to the hole edge (decreasing x/r where x is measured from the edge of the hole) and become more straight (deep cracks). For an increasing a/c_1, a more uniform β distribution along the crack front can be observed. This result is expected since the cracks are beginning to look more like straight through cracks. At the penetrated surface (z/t = 1.0), a somewhat higher β, as seen in Figure 4, is due to the severe stress state in the small ligament between the crack front and sheet surface. For more oblique crack fronts, β at the penetrated surface is higher. For a single hole in an infinite sheet, the β solution exhibits an increase for all a/c_1 values at the penetrated surface. The

same trend is seen here except for the largest a/c_1 values (= 5.0, 10.0) where the crack is nearly straight and behaves as such. The a/c_1 ratio clearly shows an increase in β for large c_1 values, this phenomenon, crack interaction, will be discussed later.

The choice of boundary conditions $u(x = b) = 0$, introduces a non uniform normal stress, σ_{xx}, at the edges of the specimen. This normal stress lowers the β values if the crack is close to the hole edge, and generally results in a slightly lower β along the entire crack front.

Figure 5 shows an increase in β along the crack front for an increasing a/t ratio for a given a/c_1 and r/t. Only at the free surface and penetrated surface is β decreasing with increasing a/t. No change in crack shape takes place, only an increase in the crack area, this trend for given a/c_1 and r/t was also shown for a single hole solution.

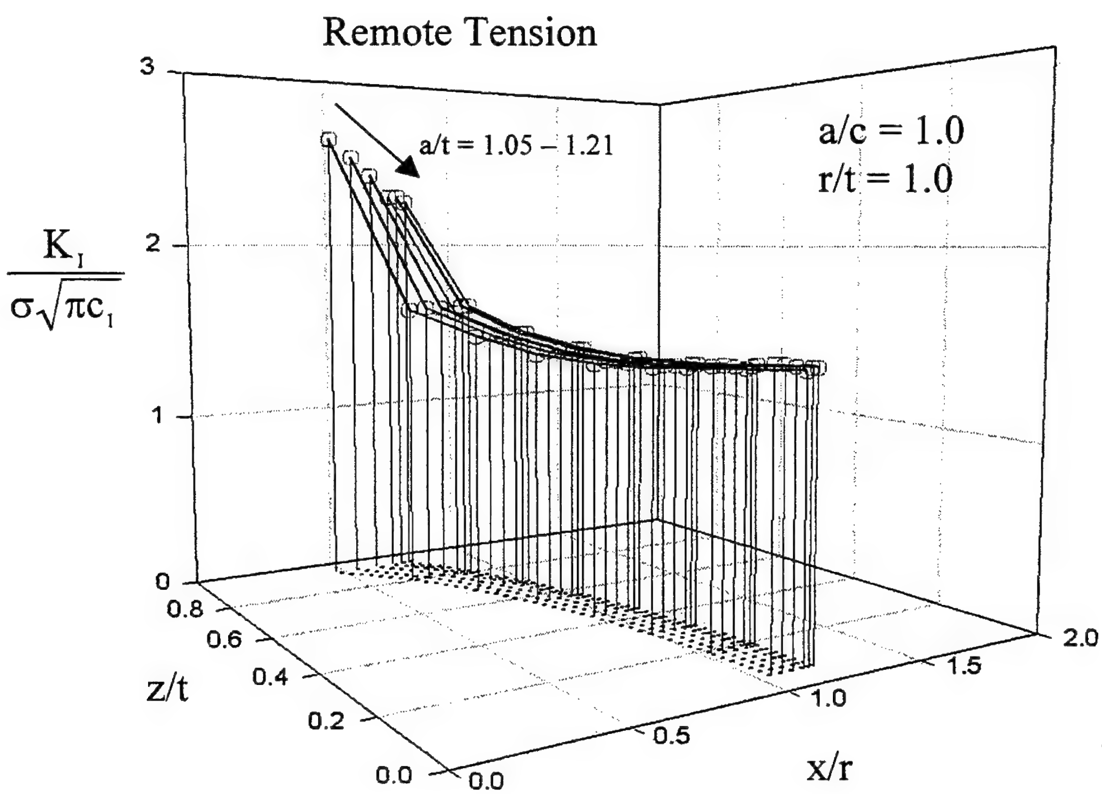

Figure 5 Effect of changing a/t on β for a/c1 = 1.0 and r/t = 1.0

As mentioned earlier, trends for the interdependent crack shape parameters are difficult to see. Some trends that were seen are listed below:

- Remote Tension

  for all a/t, r/t, increasing a/c_1 ($c_1 < c^*$), increasing β

  for all a/t, r/t, increasing a/c_1 ($c_1 > c^*$), decreasing β (crack interaction) comparison with reference [5]:

    shallow cracks, $a/c_1 \le 0.6$ ($c_1 < c^*$), all r/t, increasing a/t $\rightarrow$ increasing β

    deep cracks, $a/c_1 > 0.6$ ($c_1 < c^*$), all r/t, increasing a/t $\rightarrow$ decreasing β

  Solutions show the same trends, apart from the crack interaction regions

- Remote Bending

  for all a/c_1, r/t, increasing a/t yields a decreasing β comparison with [5]:

  Bending solutions show similar trends, deviations caused by crack interaction.

- Pin Loading ($\text{Cos}^2\theta$ Load distribution)

  for a/c_1 ($c_1 < c^*$), a/t, increasing r/t, increasing β

  for a/c_1 ($c_1 < c^*$), r/t, increasing a/t, decreasing β comparison with [5]:

  Solutions show the same trends, apart from the crack interaction regions. (c^* is the crack length c_1 for which the interaction effect of the adjacent holes can be noticed).

The crack interaction can be studied by comparing published finite element solutions for a single hole in a finite width sheet to the solutions for an array of holes in an infinite width sheet calculated in this investigation. For large values of a/c_1, deep cracks, Figure 6 shows an 8% difference between the remote tension solutions for a single hole and the present (array of holes) solutions. This small difference is caused by the normal stress σ_{xx}. For smaller a/c_1 values, large shallow cracks, higher β solutions for the present study indicate the presence of crack interaction. Figure 6, $a/c_1 = 0.6$ ($c_1 = 4.445$ mm at 64% of l_{lig}) shows the noticeable effect of crack interaction. With increasing r/t, constant a/c_1, the crack interaction decreases. It is odd that the crack interaction would be dependent on the r/t ratio, but recall the crack length c_1 decreases for increasing r/t. The hole radius is kept constant throughout this investigation, when r/t increases the thickness must decrease. If the thickness is reduced, a must decrease in order to maintain a constant a/t ratio. Furthermore, to keep a constant a/c_1 as a decreases, c_1 must also decrease.

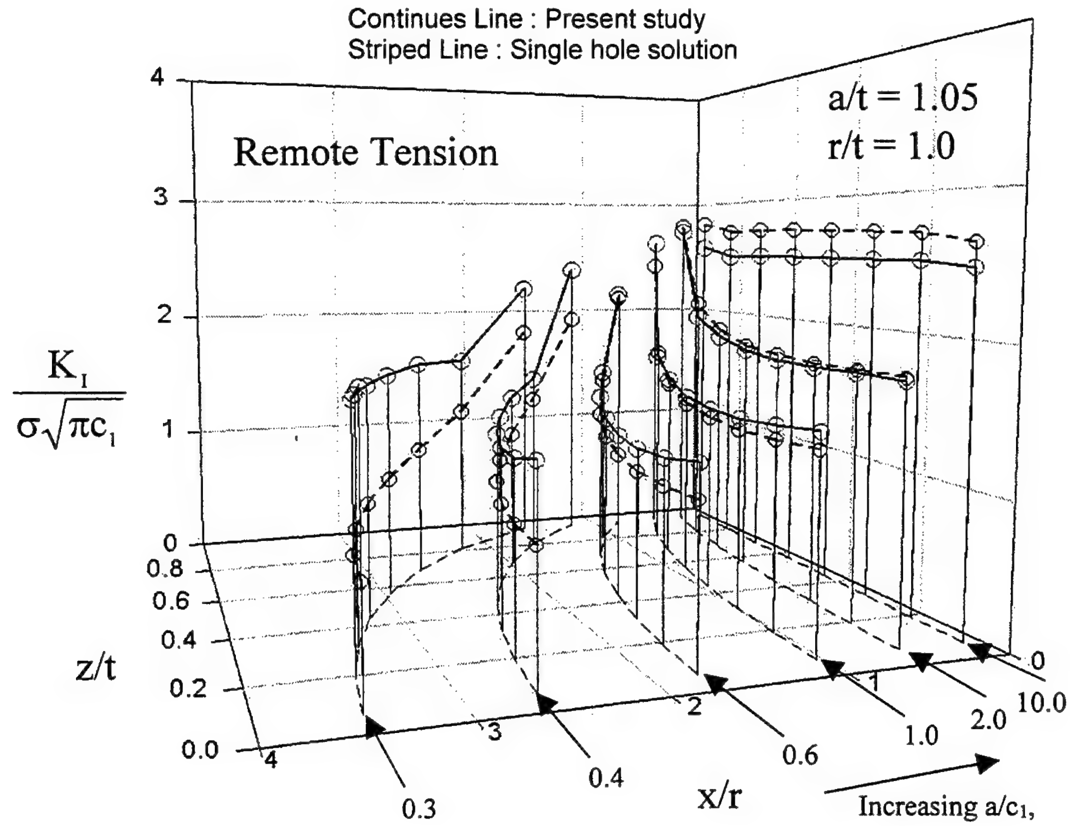

Figure 6 Effect of changing a/c1 on β for a/t = 1.05 and r/t = 1.0. Comparison between array of holes and single hole shows crack interaction effect

Oblique part-elliptical cracks for large a/c_1 ratios, large a/t and increasing r/t are similar to straight through cracks, the oblique part-elliptical shape is almost a straight through crack. These large values of a/c_1 show similar crack interaction effects as straight through cracks. For $a/c_1 = 1.0$, r/t = 2.0 and a/t = 3.0, an almost straight crack front can be seen. For these values, the crack length on the faying surface c_1 is equal to 3.81 (50% of l_{lig}). In this case, the same interaction effect can be found for straight cracks. According to reference [9], straight through cracks showed significant crack interaction when l_{lig} became smaller than half the pitch between the holes (at 50% of l_{lig}).

Oblique part-elliptical through cracks with an almost straight crack front, deep cracks, show the same crack growth as straight cracks (crack interaction around 50% of l_{lig}). Oblique part-elliptical through cracks with a more curved crack front, shallow cracks, show less crack interaction effect

than the straight cracks. Shallow cracks grow slower towards one another (crack interaction will show a significant effect for a remaining l_{lig} ranging from 50 to 20%).

The applied remote bending stress at the top of the plate creates a bending stress that varies linear through the thickness. On the faying surface this will have an increasing effect on β, and on the penetrated surface, a decreasing effect. With these higher β's it is easy to assume that the crack interaction would be worse for the combined solution. The generally higher β's at the faying surface will create an increase in the crack growth rate. An increase in crack growth does not change the crack interaction. Crack interaction is only dependent on the remaining ligament distance.

An increase in the crack growth rate means that the crack length c_1 at which the interaction effect is noticeably present will be reached earlier in life. The bending component will reduce the total fatigue life of the test specimen, but it will not change the crack interaction. For the pin loading, a similar increase in crack growth rate will be seen, but the crack interaction is not affected.

4. Conclusions

Stress intensity factors have been calculated for the following frequently observed crack shapes with a/c_1 ratios of 0.3, 0.4, 0.6, 0.8, 1.0, 2.0, 5.0 and 10.0; a/t ratios of 1.05, 1.09, 1.13, 1.17, 1.19, 1.21, 2.0, 3.0 and 5.0; and r/t ratios of 1.0, 1.27, 1.5, 2.0 and 2.5. These K's are calculated for the aforementioned crack shapes and three different load cases, remote tension, remote bending and pin loading (cosine^2 load distribution).

Trends for the interdependent crack shape parameters are difficult to see. Some trends are clear, although more difficult to characterize than the solutions for a single hole. For cracks ($c_1 < c^*$) subjected to pure tension, β increases with increasing a/c_1 for all a/t and r/t ratios. However for cracks ($c_1 > c^*$) β decreases with increasing a/c_1 for all a/t and r/t ratios.

For pure bending, similar trends were found as for a single hole solution subjected to the same remote bending load. However, the differences that can be found are caused by the crack

interaction. Apart from this similar behavior, for all a/c_1, r/t, increasing a/t a decreasing β was found for the bending case.

Again for the pin load solutions, similar trends that could be found for the single hole solutions were found for the new β solutions except for the crack interaction regions. These similar trends are increasing β`s for all $a/c_1$ (where $c_1 < c^*$) and $a/t$ with increasing $r/t$, and decreasing $\beta$`s for a/c_1 (where $c_1 < c^*$) and r/t with increasing a/t.

From these trends the following can be stated: Oblique part-elliptical through cracks with an almost straight crack front, deep cracks, show the same crack growth behavior as straight cracks, meaning that the crack interaction for these oblique part-elliptical through cracks occurs when 50% of the ligament remains uncracked. Oblique part-elliptical through cracks with a more curved crack front, shallow cracks, show less crack interaction effect than the straight cracks do, crack interaction is noticeable when less than 50% of the ligament remains uncracked. Thus, shallow cracks grow slower towards one another.

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Appendix A. Stress Intensity Factor Solutions for Oblique Part Elliptical Through Cracks Emanating from Adjacent Holes in a Infinite Sheet Subjected to General Loading

Remote Tension

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.05	1	0.063	1.855	1.394	1.324	1.400	1.467	1.759	2.203	2.488
		0.188	1.713	1.305	1.252	1.345	1.425	1.755	2.233	2.525
		0.313	1.664	1.270	1.216	1.306	1.389	1.736	2.232	2.524
		0.438	1.655	1.276	1.218	1.299	1.381	1.737	2.241	2.526
		0.563	1.659	1.307	1.257	1.323	1.404	1.763	2.262	2.529
		0.688	1.672	1.378	1.351	1.402	1.487	1.837	2.303	2.531
		0.813	1.634	1.458	1.494	1.536	1.623	1.972	2.372	2.523
		0.938	2.225	2.399	2.158	2.561	2.637	2.744	2.691	2.601
	1.27	0.063	1.320	1.264	1.340	1.435	1.532	1.870	2.327	2.586
		0.188	1.240	1.189	1.276	1.384	1.489	1.865	2.356	2.614
		0.313	1.232	1.168	1.245	1.349	1.455	1.847	2.350	2.605
		0.438	1.262	1.186	1.249	1.348	1.451	1.849	2.355	2.601
		0.563	1.312	1.234	1.289	1.381	1.479	1.877	2.372	2.600
		0.688	1.394	1.328	1.386	1.478	1.571	1.954	2.410	2.598
		0.813	1.466	1.445	1.531	1.628	1.724	2.098	2.477	2.585
		0.938	2.444	2.524	2.667	2.755	2.817	2.900	2.812	2.658
	1.5	0.063	1.203	1.231	1.349	1.478	1.592	1.950	2.394	2.632
		0.188	1.132	1.160	1.290	1.426	1.549	1.945	2.420	2.655
		0.313	1.132	1.142	1.263	1.392	1.515	1.926	2.411	2.641
		0.438	1.170	1.165	1.273	1.393	1.511	1.928	2.413	2.633
		0.563	1.231	1.221	1.319	1.430	1.542	1.958	2.428	2.628
		0.688	1.333	1.326	1.429	1.534	1.638	2.037	2.464	2.622
		0.813	1.434	1.460	1.573	1.696	1.802	2.185	2.528	2.606
		0.938	2.528	2.618	2.733	2.887	2.949	3.000	2.860	2.672
	2	0.063	1.112	1.218	1.409	1.564	1.701	2.070	2.497	2.696
		0.188	1.057	1.157	1.349	1.513	1.656	2.063	2.519	2.710
		0.313	1.069	1.149	1.324	1.481	1.622	2.043	2.506	2.690
		0.438	1.118	1.184	1.340	1.486	1.620	2.045	2.503	2.675
		0.563	1.193	1.252	1.395	1.531	1.656	2.076	2.513	2.664
		0.688	1.321	1.376	1.519	1.646	1.760	2.157	2.544	2.653
		0.813	1.459	1.524	1.696	1.832	1.942	2.315	2.602	2.631
		0.938	2.740	2.824	3.021	3.136	3.169	3.155	2.923	2.685
	2.5	0.063	1.101	1.226	1.479	1.660	1.802	2.173	2.571	2.730
		0.188	1.048	1.170	1.417	1.604	1.754	2.164	2.591	2.742
		0.313	1.062	1.170	1.392	1.569	1.718	2.142	2.575	2.716
		0.438	1.117	1.214	1.409	1.573	1.716	2.143	2.569	2.697
		0.563	1.201	1.293	1.469	1.619	1.754	2.173	2.575	2.682
		0.688	1.342	1.437	1.602	1.739	1.862	2.253	2.602	2.666
		0.813	1.489	1.619	1.794	1.934	2.056	2.418	2.657	2.635

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.13	1	0.063	2.483	1.489	1.363	1.399	1.453	1.726	2.172	2.466
		0.188	2.257	1.397	1.301	1.354	1.422	1.732	2.208	2.507
		0.313	2.131	1.358	1.266	1.323	1.394	1.722	2.211	2.508
		0.438	2.047	1.359	1.264	1.320	1.392	1.728	2.222	2.511
		0.563	1.976	1.388	1.295	1.349	1.417	1.757	2.246	2.519
		0.688	1.913	1.453	1.371	1.427	1.494	1.828	2.292	2.530
		0.813	1.770	1.555	1.522	1.578	1.633	1.963	2.376	2.553
		0.938	1.885	2.412	2.384	2.420	2.430	2.523	2.635	2.658
	1.27	0.063	1.439	1.307	1.345	1.425	1.510	1.835	2.292	2.565
		0.188	1.351	1.235	1.290	1.384	1.480	1.842	2.325	2.598
		0.313	1.336	1.213	1.263	1.356	1.456	1.833	2.324	2.591
		0.438	1.362	1.230	1.271	1.359	1.458	1.841	2.331	2.590
		0.563	1.408	1.279	1.312	1.394	1.491	1.873	2.353	2.592
		0.688	1.484	1.370	1.404	1.483	1.578	1.949	2.396	2.601
		0.813	1.576	1.516	1.568	1.639	1.738	2.095	2.479	2.623
		0.938	2.490	2.493	2.532	2.562	2.599	2.684	2.741	2.730
	1.5	0.063	1.265	1.259	1.352	1.460	1.563	1.922	2.370	2.619
		0.188	1.194	1.192	1.300	1.421	1.533	1.929	2.404	2.645
		0.313	1.190	1.176	1.276	1.395	1.509	1.920	2.399	2.634
		0.438	1.227	1.199	1.286	1.402	1.513	1.927	2.405	2.629
		0.563	1.290	1.255	1.333	1.442	1.550	1.961	2.424	2.629
		0.688	1.391	1.358	1.431	1.540	1.643	2.038	2.469	2.635
		0.813	1.524	1.525	1.611	1.713	1.815	2.190	2.553	2.655
		0.938	2.557	2.561	2.617	2.683	2.716	2.794	2.829	2.762
	2	0.063	1.159	1.237	1.402	1.562	1.673	2.036	2.464	2.682
		0.188	1.097	1.179	1.353	1.520	1.642	2.043	2.495	2.703
		0.313	1.100	1.172	1.333	1.495	1.619	2.033	2.487	2.684
		0.438	1.145	1.206	1.350	1.502	1.624	2.043	2.489	2.673
		0.563	1.221	1.275	1.407	1.548	1.665	2.080	2.506	2.668
		0.688	1.343	1.397	1.523	1.655	1.766	2.162	2.547	2.670
		0.813	1.513	1.584	1.715	1.848	1.958	2.326	2.630	2.687
		0.938	2.688	2.756	2.839	2.895	2.919	2.953	2.903	2.789
	2.5	0.063	1.130	1.245	1.469	1.639	1.774	2.144	2.551	2.723
		0.188	1.079	1.192	1.418	1.596	1.742	2.149	2.580	2.739
		0.313	1.092	1.189	1.398	1.571	1.718	2.138	2.570	2.717
		0.438	1.146	1.230	1.418	1.581	1.724	2.147	2.569	2.701
		0.563	1.231	1.307	1.480	1.631	1.768	2.184	2.583	2.692
		0.688	1.368	1.444	1.606	1.746	1.874	2.267	2.622	2.692
		0.813	1.555	1.646	1.817	1.957	2.081	2.439	2.704	2.704

		0.938	2.894	3.043	3.210	3.295	3.335	3.274	2.968	2.657
1.09	1	0.063	2.106	1.439	1.354	1.401	1.463	1.740	2.440	2.476
		0.188	1.935	1.349	1.288	1.351	1.427	1.743	2.484	2.515
		0.313	1.859	1.313	1.251	1.317	1.395	1.729	2.485	2.515
		0.438	1.830	1.316	1.248	1.313	1.391	1.733	2.497	2.518
		0.563	1.815	1.347	1.279	1.340	1.415	1.762	2.523	2.524
		0.688	1.801	1.415	1.357	1.420	1.494	1.835	2.573	2.532
		0.813	1.737	1.509	1.501	1.568	1.634	1.974	2.662	2.543
		0.938	2.231	2.414	2.440	2.499	2.531	2.628	2.987	2.646
	1.27	0.063	1.375	1.285	1.342	1.426	1.518	1.853	2.305	2.572
		0.188	1.292	1.212	1.283	1.381	1.483	1.855	2.334	2.601
		0.313	1.281	1.190	1.254	1.351	1.455	1.842	2.332	2.594
		0.438	1.310	1.208	1.261	1.353	1.454	1.847	2.338	2.592
		0.563	1.359	1.257	1.302	1.388	1.486	1.878	2.357	2.593
		0.688	1.439	1.351	1.397	1.483	1.576	1.956	2.398	2.597
		0.813	1.525	1.487	1.556	1.640	1.737	2.105	2.476	2.606
		0.938	2.482	2.523	2.606	2.658	2.705	2.789	2.767	2.708
	1.5	0.063	1.231	1.244	1.351	1.470	1.580	1.934	2.383	2.625
		0.188	1.160	1.176	1.295	1.424	1.544	1.937	2.412	2.650
		0.313	1.159	1.159	1.268	1.395	1.516	1.923	2.406	2.638
		0.438	1.198	1.183	1.278	1.399	1.517	1.929	2.410	2.632
		0.563	1.261	1.240	1.323	1.439	1.551	1.961	2.427	2.629
		0.688	1.364	1.344	1.424	1.540	1.646	2.041	2.468	2.630
		0.813	1.485	1.499	1.597	1.710	1.817	2.196	2.547	2.637
		0.938	2.562	2.604	2.691	2.783	2.829	2.896	2.855	2.735
	2	0.063	1.142	1.229	1.407	1.568	1.685	2.052	2.474	2.691
		0.188	1.079	1.169	1.353	1.521	1.649	2.052	2.501	2.709
		0.313	1.083	1.162	1.330	1.493	1.620	2.038	2.491	2.690
		0.438	1.127	1.196	1.347	1.498	1.623	2.045	2.490	2.677
		0.563	1.203	1.266	1.403	1.543	1.663	2.080	2.504	2.669
		0.688	1.326	1.390	1.524	1.653	1.766	2.163	2.542	2.666
		0.813	1.482	1.564	1.711	1.845	1.958	2.329	2.618	2.666
		0.938	2.718	2.808	2.933	3.007	3.042	3.053	2.918	2.760
	2.5	0.063	1.116	1.239	1.479	1.649	1.789	2.158	2.558	2.729
		0.188	1.064	1.185	1.422	1.600	1.749	2.157	2.582	2.742
		0.313	1.078	1.183	1.399	1.571	1.720	2.141	2.569	2.719
		0.438	1.133	1.224	1.418	1.578	1.723	2.146	2.566	2.701
		0.563	1.218	1.301	1.478	1.627	1.765	2.181	2.577	2.690
		0.688	1.358	1.442	1.607	1.745	1.872	2.264	2.611	2.682
		0.813	1.531	1.637	1.812	1.954	2.078	2.438	2.685	2.677
		0.938	2.899	2.984	3.116	3.179	3.212	3.177	2.982	2.761

		0.938	2.853	2.907	3.014	3.058	3.087	3.082	2.975	2.801
1.17	1	0.063	3.535	1.548	1.373	1.399	1.428	1.712	2.156	2.618
		0.188	3.187	1.453	1.314	1.358	1.403	1.723	2.195	2.513
		0.313	2.938	1.410	1.280	1.329	1.378	1.715	2.199	2.514
		0.438	2.725	1.407	1.278	1.328	1.376	1.722	2.211	2.519
		0.563	2.513	1.433	1.309	1.357	1.401	1.751	2.235	2.526
		0.688	2.314	1.493	1.384	1.433	1.472	1.819	2.281	2.541
		0.813	2.053	1.597	1.538	1.583	1.601	1.947	2.364	2.569
		0.938	1.763	2.407	2.335	2.349	2.296	2.435	2.592	2.670
	1.27	0.063	1.509	1.328	1.346	1.417	1.498	1.821	2.279	2.558
		0.188	1.416	1.257	1.295	1.382	1.474	1.833	2.315	2.592
		0.313	1.396	1.234	1.270	1.357	1.452	1.826	2.316	2.587
		0.438	1.418	1.250	1.277	1.362	1.456	1.835	2.324	2.586
		0.563	1.461	1.299	1.318	1.398	1.490	1.868	2.347	2.591
		0.688	1.531	1.388	1.408	1.486	1.575	1.941	2.391	2.603
		0.813	1.625	1.539	1.574	1.643	1.731	2.080	2.475	2.632
		0.938	2.492	2.461	2.464	2.486	2.505	2.593	2.707	2.736
	1.5	0.063	1.304	1.273	1.353	1.455	1.551	1.899	2.362	2.612
		0.188	1.231	1.208	1.305	1.420	1.527	1.911	2.398	2.641
		0.313	1.225	1.191	1.282	1.397	1.507	1.905	2.396	2.631
		0.438	1.260	1.213	1.293	1.404	1.512	1.915	2.403	2.626
		0.563	1.321	1.270	1.339	1.444	1.549	1.949	2.424	2.628
		0.688	1.418	1.371	1.435	1.539	1.640	2.025	2.469	2.638
		0.813	1.558	1.545	1.614	1.707	1.808	2.171	2.554	2.666
		0.938	2.547	2.517	2.538	2.587	2.617	2.699	2.800	2.771
	2	0.063	1.176	1.245	1.400	1.546	1.661	2.023	2.616	2.677
		0.188	1.114	1.190	1.355	1.510	1.636	2.035	2.503	2.701
		0.313	1.117	1.182	1.336	1.488	1.616	2.028	2.498	2.684
		0.438	1.161	1.215	1.353	1.498	1.623	2.040	2.501	2.673
		0.563	1.237	1.283	1.408	1.545	1.665	2.077	2.519	2.671
		0.688	1.357	1.402	1.520	1.650	1.763	2.158	2.562	2.678
		0.813	1.538	1.594	1.709	1.842	1.950	2.315	2.647	2.704
		0.938	2.648	2.694	2.743	2.793	2.810	2.864	2.893	2.806
	2.5	0.063	1.140	1.233	1.464	1.629	1.762	2.128	2.545	2.720
		0.188	1.090	1.185	1.417	1.592	1.736	2.140	2.577	2.739
		0.313	1.102	1.180	1.399	1.570	1.716	2.132	2.569	2.719
		0.438	1.156	1.214	1.420	1.582	1.724	2.143	2.570	2.704
		0.563	1.241	1.283	1.481	1.632	1.769	2.181	2.587	2.698
		0.688	1.375	1.408	1.603	1.743	1.872	2.263	2.628	2.702
		0.813	1.571	1.576	1.814	1.952	2.075	2.428	2.712	2.725
		0.938	2.797	2.682	2.916	2.948	2.975	2.992	2.957	2.822

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.19	1	0.063	*	1.581	1.379	1.399	1.442	1.701	2.149	2.613
		0.188	*	1.484	1.321	1.360	1.417	1.714	2.189	2.509
		0.313	*	1.438	1.288	1.332	1.394	1.707	2.193	2.510
		0.438	*	1.433	1.286	1.332	1.394	1.716	2.205	2.515
		0.563	*	1.456	1.316	1.361	1.422	1.745	2.230	2.524
		0.688	*	1.513	1.391	1.435	1.492	1.811	2.276	2.539
		0.813	*	1.614	1.545	1.584	1.640	1.937	2.358	2.570
		0.938	*	2.396	2.314	2.316	2.299	2.394	2.572	2.666
	1.27	0.063	1.552	1.341	1.349	1.401	1.494	1.814	2.273	2.554
		0.188	1.456	1.270	1.299	1.368	1.472	1.828	2.310	2.589
		0.313	1.432	1.246	1.274	1.343	1.452	1.822	2.311	2.584
		0.438	1.451	1.262	1.282	1.346	1.457	1.832	2.321	2.584
		0.563	1.492	1.309	1.322	1.378	1.490	1.864	2.343	2.589
		0.688	1.559	1.398	1.411	1.460	1.573	1.936	2.388	2.602
		0.813	1.655	1.552	1.577	1.602	1.728	2.071	2.471	2.634
		0.938	2.506	2.450	2.435	2.375	2.464	2.552	2.690	2.735
	1.5	0.063	1.324	1.281	1.354	1.448	1.548	1.892	2.356	2.608
		0.188	1.250	1.217	1.307	1.415	1.525	1.906	2.394	2.638
		0.313	1.243	1.199	1.285	1.393	1.506	1.901	2.392	2.629
		0.438	1.276	1.221	1.296	1.401	1.513	1.912	2.400	2.625
		0.563	1.337	1.277	1.341	1.440	1.550	1.946	2.421	2.627
		0.688	1.433	1.378	1.436	1.533	1.638	2.020	2.466	2.639
		0.813	1.576	1.553	1.616	1.699	1.804	2.162	2.551	2.670
		0.938	2.546	2.498	2.505	2.539	2.573	2.658	2.783	2.772
	2	0.063	1.185	1.249	1.394	1.542	1.651	2.016	2.611	2.675
		0.188	1.123	1.195	1.351	1.508	1.629	2.030	2.500	2.699
		0.313	1.125	1.187	1.333	1.488	1.611	2.025	2.496	2.683
		0.438	1.169	1.219	1.350	1.498	1.620	2.037	2.499	2.674
		0.563	1.245	1.286	1.404	1.545	1.662	2.074	2.518	2.672
		0.688	1.364	1.403	1.515	1.648	1.759	2.153	2.562	2.680
		0.813	1.548	1.596	1.704	1.838	1.945	2.307	2.647	2.709
		0.938	2.631	2.660	2.698	2.746	2.762	2.823	2.879	2.810
	2.5	0.063	1.143	1.257	1.463	1.620	1.751	2.122	2.532	2.718
		0.188	1.094	1.204	1.418	1.586	1.728	2.135	2.566	2.739
		0.313	1.106	1.199	1.401	1.566	1.709	2.130	2.560	2.719
		0.438	1.159	1.236	1.421	1.579	1.719	2.141	2.562	2.706
		0.563	1.244	1.309	1.482	1.630	1.765	2.179	2.579	2.700
		0.688	1.378	1.436	1.602	1.741	1.867	2.260	2.621	2.706
		0.813	1.576	1.652	1.811	1.948	2.068	2.421	2.705	2.732
		0.938	2.768	2.773	2.870	2.899	2.924	2.952	2.935	2.830

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
2	1	0.063	*	*	2.063	1.547	1.461	1.528	1.921	2.256
		0.188	*	*	2.007	1.542	1.471	1.565	1.981	2.316
		0.313	*	*	1.947	1.527	1.466	1.571	1.994	2.326
		0.438	*	*	1.909	1.524	1.468	1.579	2.004	2.334
		0.563	*	*	1.895	1.539	1.485	1.594	2.018	2.343
		0.688	*	*	1.913	1.579	1.522	1.621	2.037	2.357
		0.813	*	*	1.994	1.667	1.598	1.665	2.061	2.374
		0.938	*	*	2.312	1.907	1.781	1.764	2.077	2.365
	1.27	0.063	*	4.770	1.566	1.444	1.438	1.606	2.033	2.383
		0.188	*	4.413	1.548	1.447	1.451	1.646	2.095	2.444
		0.313	*	4.000	1.528	1.441	1.450	1.655	2.109	2.450
		0.438	*	3.628	1.527	1.446	1.457	1.665	2.120	2.455
		0.563	*	3.293	1.549	1.468	1.478	1.682	2.134	2.464
		0.688	*	2.995	1.603	1.516	1.520	1.711	2.155	2.479
		0.813	*	2.690	1.719	1.612	1.601	1.759	2.181	2.500
		0.938	*	2.590	2.043	1.843	1.810	1.863	2.198	2.494
	1.5	0.063	*	1.991	1.461	1.420	1.450	1.680	2.109	2.450
		0.188	*	1.916	1.450	1.427	1.467	1.722	2.173	2.509
		0.313	*	1.862	1.438	1.423	1.467	1.732	2.188	2.513
		0.438	*	1.840	1.444	1.431	1.476	1.743	2.199	2.517
		0.563	*	1.852	1.472	1.457	1.499	1.761	2.214	2.526
		0.688	*	1.905	1.532	1.508	1.545	1.792	2.235	2.542
		0.813	*	2.041	1.655	1.607	1.630	1.842	2.262	2.564
		0.938	*	2.516	1.968	1.834	1.839	1.947	2.280	2.560
	2	0.063	1.915	1.473	1.400	1.442	1.498	1.791	2.254	2.549
		0.188	1.828	1.438	1.395	1.451	1.519	1.838	2.320	2.606
		0.313	1.785	1.421	1.389	1.451	1.521	1.849	2.335	2.608
		0.438	1.783	1.433	1.400	1.462	1.533	1.862	2.346	2.609
		0.563	1.819	1.476	1.434	1.492	1.559	1.883	2.361	2.617
		0.688	1.898	1.559	1.501	1.548	1.608	1.917	2.383	2.634
		0.813	2.072	1.724	1.629	1.656	1.697	1.971	2.412	2.658
		0.938	2.674	2.183	1.928	1.920	1.939	2.081	2.430	2.656
	2.5	0.063	1.475	1.383	1.403	1.483	1.573	1.905	2.366	2.628
		0.188	1.422	1.353	1.401	1.495	1.594	1.953	2.437	2.683
		0.313	1.408	1.343	1.398	1.496	1.597	1.966	2.453	2.683
		0.438	1.430	1.360	1.412	1.509	1.611	1.980	2.465	2.682
		0.563	1.487	1.408	1.450	1.541	1.640	2.002	2.482	2.690
		0.688	1.590	1.497	1.519	1.601	1.693	2.038	2.507	2.707
		0.813	1.786	1.666	1.654	1.709	1.788	2.095	2.538	2.732
		0.938	2.371	2.108	2.002	2.019	2.039	2.207	2.559	2.732

1.21	1	0.063	*	1.617	1.385	1.400	1.440	1.696	2.142	2.609
		0.188	*	1.518	1.329	1.362	1.417	1.710	2.183	2.506
		0.313	*	1.469	1.296	1.336	1.395	1.704	2.188	2.507
		0.438	*	1.461	1.294	1.335	1.396	1.713	2.200	2.513
		0.563	*	1.482	1.324	1.364	1.423	1.741	2.225	2.521
		0.688	*	1.536	1.397	1.437	1.493	1.806	2.270	2.537
		0.813	*	1.638	1.551	1.585	1.638	1.928	2.351	2.570
		0.938	*	2.402	2.294	2.287	2.266	2.358	2.552	2.663
	1.27	0.063	1.592	1.350	1.348	1.416	1.492	1.801	2.259	2.542
		0.188	1.492	1.280	1.300	1.383	1.472	1.817	2.297	2.578
		0.313	1.465	1.256	1.275	1.361	1.453	1.812	2.299	2.573
		0.438	1.482	1.271	1.283	1.365	1.458	1.823	2.309	2.573
		0.563	1.521	1.318	1.324	1.400	1.492	1.855	2.332	2.579
		0.688	1.585	1.406	1.411	1.482	1.573	1.926	2.377	2.593
		0.813	1.677	1.562	1.577	1.649	1.725	2.058	2.459	2.626
		0.938	2.497	2.433	2.405	2.387	2.426	2.511	2.665	2.724
	1.5	0.063	1.344	1.289	1.359	1.445	1.543	1.885	2.350	2.604
		0.188	1.269	1.225	1.313	1.415	1.523	1.901	2.389	2.636
		0.313	1.261	1.208	1.292	1.394	1.505	1.897	2.389	2.627
		0.438	1.293	1.229	1.303	1.402	1.512	1.908	2.397	2.623
		0.563	1.353	1.284	1.349	1.441	1.549	1.942	2.418	2.626
		0.688	1.448	1.384	1.444	1.532	1.636	2.015	2.464	2.640
		0.813	1.591	1.562	1.625	1.697	1.799	2.153	2.547	2.672
		0.938	2.537	2.480	2.488	2.501	2.531	2.619	2.766	2.772
	2	0.063	1.195	1.253	1.394	1.536	1.646	2.008	2.608	2.672
		0.188	1.133	1.200	1.352	1.504	1.627	2.024	2.498	2.698
		0.313	1.134	1.192	1.334	1.485	1.610	2.021	2.494	2.682
		0.438	1.177	1.223	1.352	1.496	1.619	2.034	2.499	2.674
		0.563	1.253	1.290	1.405	1.542	1.661	2.071	2.518	2.673
		0.688	1.371	1.405	1.514	1.644	1.757	2.149	2.562	2.683
		0.813	1.558	1.599	1.701	1.833	1.939	2.298	2.646	2.714
		0.938	2.615	2.632	2.659	2.703	2.716	2.780	2.866	2.812
	2.5	0.063	1.163	1.260	1.461	1.617	1.744	2.115	2.528	2.717
		0.188	1.101	1.208	1.418	1.585	1.724	2.131	2.564	2.738
		0.313	1.106	1.203	1.401	1.566	1.707	2.127	2.558	2.719
		0.438	1.153	1.239	1.422	1.579	1.718	2.139	2.561	2.706
		0.563	1.236	1.312	1.481	1.630	1.763	2.177	2.579	2.703
		0.688	1.362	1.437	1.600	1.738	1.864	2.256	2.622	2.709
		0.813	1.573	1.654	1.807	1.943	2.061	2.414	2.705	2.739
		0.938	2.695	2.739	2.827	2.852	2.875	2.914	2.924	2.834

3	1	0.063	*	*	*	3.172	1.794	1.471	1.728	2.060
		0.188	*	*	*	3.132	1.818	1.513	1.790	2.128
		0.313	*	*	*	3.042	1.812	1.523	1.805	2.142
		0.438	*	*	*	2.951	1.806	1.529	1.812	2.149
		0.563	*	*	*	2.867	1.809	1.537	1.819	2.155
		0.688	*	*	*	2.797	1.826	1.550	1.825	2.160
		0.813	*	*	*	2.756	1.864	1.568	1.829	2.160
		0.938	*	*	*	2.805	1.948	1.592	1.804	2.117
	1.27	0.063	*	*	5.525	1.753	1.528	1.495	1.838	2.181
		0.188	*	*	5.347	1.773	1.558	1.541	1.904	2.251
		0.313	*	*	4.993	1.766	1.561	1.552	1.920	2.265
		0.438	*	*	4.624	1.764	1.565	1.559	1.929	2.272
		0.563	*	*	4.267	1.774	1.578	1.569	1.936	2.277
		0.688	*	*	3.931	1.800	1.602	1.583	1.943	2.283
		0.813	*	*	3.605	1.855	1.646	1.603	1.947	2.284
		0.938	*	*	3.448	1.973	1.724	1.624	1.920	2.241
	1.5	0.063	*	*	2.068	1.556	1.469	1.533	1.925	2.266
		0.188	*	*	2.066	1.580	1.501	1.582	1.994	2.337
		0.313	*	*	2.042	1.581	1.507	1.593	2.011	2.351
		0.438	*	*	2.029	1.586	1.514	1.602	2.020	2.357
		0.563	*	*	2.033	1.601	1.528	1.612	2.028	2.363
		0.688	*	*	2.063	1.633	1.554	1.627	2.035	2.369
		0.813	*	*	2.137	1.690	1.598	1.648	2.039	2.371
		0.938	*	*	2.316	1.800	1.671	1.676	2.010	2.327
	2	0.063	*	3.138	1.542	1.449	1.453	1.631	2.055	2.408
		0.188	*	3.040	1.558	1.478	1.486	1.683	2.128	2.483
		0.313	*	2.936	1.557	1.483	1.495	1.697	2.147	2.495
		0.438	*	2.857	1.564	1.492	1.503	1.706	2.156	2.501
		0.563	*	2.810	1.587	1.511	1.520	1.718	2.165	2.506
		0.688	*	2.804	1.631	1.545	1.549	1.734	2.173	2.514
		0.813	*	2.868	1.711	1.602	1.597	1.757	2.177	2.517
		0.938	*	3.129	1.867	1.699	1.686	1.785	2.147	2.471
	2.5	0.063	*	1.736	1.450	1.440	1.475	1.717	2.168	2.634
		0.188	*	1.725	1.468	1.469	1.510	1.772	2.243	2.563
		0.313	*	1.714	1.471	1.477	1.520	1.787	2.263	2.575
		0.438	*	1.721	1.482	1.489	1.530	1.798	2.274	2.580
		0.563	*	1.753	1.506	1.511	1.548	1.810	2.282	2.586
		0.688	*	1.818	1.551	1.549	1.579	1.827	2.291	2.593
		0.813	*	1.940	1.629	1.613	1.629	1.851	2.294	2.597
		0.938	*	2.216	1.773	1.735	1.713	1.878	2.263	2.549

* Crack Length outside FEM geometry

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	− r/t	z/t					β			
5	1	0.063	*	*	*	*	*	1.582	1.546	1.816
		0.188	*	*	*	*	*	1.634	1.605	1.885
		0.313	*	*	*	*	*	1.646	1.619	1.902
		0.438	*	*	*	*	*	1.650	1.624	1.908
		0.563	*	*	*	*	*	1.653	1.627	1.910
		0.688	*	*	*	*	*	1.657	1.627	1.909
		0.813	*	*	*	*	*	1.658	1.622	1.899
		0.938	*	*	*	*	*	1.636	1.580	1.841
	1.27	0.063	*	*	*	*	5.903	1.483	1.626	1.938
		0.188	*	*	*	*	5.976	1.535	1.688	2.012
		0.313	*	*	*	*	5.803	1.550	1.704	2.030
		0.438	*	*	*	*	5.565	1.555	1.710	2.036
		0.563	*	*	*	*	5.299	1.559	1.713	2.039
		0.688	*	*	*	*	5.015	1.564	1.714	2.037
		0.813	*	*	*	*	4.704	1.566	1.707	2.026
		0.938	*	*	*	*	4.382	1.542	1.663	1.965
	1.5	0.063	*	*	*	*	2.089	1.610	1.701	2.019
		0.188	*	*	*	*	2.143	1.671	1.766	2.095
		0.313	*	*	*	*	2.148	1.688	1.783	2.113
		0.438	*	*	*	*	2.147	1.695	1.789	2.120
		0.563	*	*	*	*	2.149	1.700	1.793	2.123
		0.688	*	*	*	*	2.157	1.706	1.793	2.122
		0.813	*	*	*	*	2.171	1.708	1.786	2.110
		0.938	*	*	*	*	2.177	1.679	1.739	2.046
	2	0.063	*	*	*	1.876	1.569	1.491	1.814	2.156
		0.188	*	*	*	1.926	1.620	1.545	1.884	2.235
		0.313	*	*	*	1.934	1.632	1.560	1.903	2.256
		0.438	*	*	*	1.939	1.639	1.567	1.910	2.263
		0.563	*	*	*	1.948	1.648	1.573	1.914	2.266
		0.688	*	*	*	1.965	1.662	1.579	1.914	2.265
		0.813	*	*	*	1.991	1.679	1.581	1.905	2.251
		0.938	*	*	*	2.015	1.684	1.561	1.856	2.185
	2.5	0.063	*	*	2.072	1.564	1.476	1.538	1.928	2.267
		0.188	*	*	2.118	1.613	1.526	1.595	2.002	2.350
		0.313	*	*	2.122	1.625	1.539	1.611	2.023	2.372
		0.438	*	*	2.125	1.632	1.547	1.618	2.031	2.380
		0.563	*	*	2.137	1.644	1.557	1.625	2.035	2.382
		0.688	*	*	2.162	1.663	1.571	1.631	2.035	2.381
		0.813	*	*	2.204	1.688	1.587	1.634	2.025	2.367
		0.938	*	*	2.258	1.706	1.588	1.618	1.972	2.297

* Crack Length outside FEM geometry

Remote Bending

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.05	1	0.063	0.931	0.750	0.753	0.796	0.842	1.031	1.347	1.586
		0.188	0.817	0.645	0.630	0.656	0.687	0.812	1.052	1.234
		0.313	0.732	0.553	0.508	0.510	0.518	0.568	0.701	0.801
		0.438	0.649	0.465	0.388	0.364	0.352	0.328	0.355	0.381
		0.563	0.544	0.363	0.259	0.214	0.186	0.142	-0.225	-0.302
		0.688	0.394	0.230	0.128	0.111	-0.136	-0.302	-0.553	-0.702
		0.813	0.182	0.095	-0.192	-0.285	-0.359	-0.626	-0.969	-1.147
		0.938	-0.885	-0.973	-1.086	-1.171	-1.241	-1.410	-1.566	-1.629
	1.27	0.063	0.693	0.688	0.743	0.802	0.856	1.053	1.372	1.595
		0.188	0.607	0.589	0.622	0.662	0.697	0.830	1.071	1.238
		0.313	0.544	0.503	0.502	0.514	0.525	0.580	0.714	0.802
		0.438	0.482	0.420	0.384	0.368	0.355	0.335	0.362	0.381
		0.563	0.403	0.324	0.256	0.217	0.186	0.145	-0.226	-0.301
		0.688	0.286	0.200	0.126	0.115	-0.139	-0.307	-0.556	-0.699
		0.813	0.115	0.089	-0.197	-0.289	-0.369	-0.637	-0.973	-1.139
		0.938	-0.860	-0.955	-1.101	-1.191	-1.256	-1.418	-1.579	-1.612
	1.5	0.063	0.632	0.660	0.730	0.798	0.854	1.049	1.353	1.560
		0.188	0.551	0.563	0.613	0.657	0.695	0.827	1.056	1.209
		0.313	0.491	0.479	0.495	0.510	0.523	0.578	0.704	0.782
		0.438	0.434	0.397	0.379	0.364	0.353	0.333	0.357	0.371
		0.563	0.361	0.304	0.254	0.213	0.184	0.144	-0.222	-0.292
		0.688	0.253	0.186	0.126	0.114	-0.139	-0.305	-0.545	-0.678
		0.813	0.096	0.086	-0.185	-0.290	-0.370	-0.632	-0.953	-1.105
		0.938	-0.824	-0.927	-1.049	-1.179	-1.243	-1.394	-1.540	-1.559
	2	0.063	0.608	0.659	0.755	0.825	0.878	1.069	1.357	1.549
		0.188	0.525	0.564	0.632	0.679	0.713	0.842	1.059	1.198
		0.313	0.465	0.481	0.510	0.525	0.536	0.590	0.705	0.773
		0.438	0.406	0.398	0.388	0.372	0.360	0.341	0.357	0.366
		0.563	0.334	0.304	0.257	0.215	0.185	0.147	-0.221	-0.287
		0.688	0.231	0.184	0.126	-0.117	-0.144	-0.303	-0.540	-0.665
		0.813	0.086	0.089	-0.207	-0.303	-0.381	-0.635	-0.943	-1.082
		0.938	-0.810	-0.939	-1.110	-1.197	-1.256	-1.392	-1.515	-1.521
	2.5	0.063	0.592	0.661	0.750	0.812	0.865	1.045	1.318	0.515
		0.188	0.515	0.568	0.628	0.668	0.702	0.823	1.027	0.398
		0.313	0.457	0.486	0.504	0.515	0.526	0.577	0.684	0.257
		0.438	0.400	0.404	0.382	0.364	0.352	0.335	0.346	0.122
		0.563	0.328	0.308	0.251	0.209	0.181	0.144	-0.213	-0.095
		0.688	0.223	0.184	0.122	-0.114	-0.140	-0.290	-0.520	-0.222
		0.813	0.072	0.103	-0.207	-0.298	-0.373	-0.613	-0.909	-0.363
		0.938	-0.809	-0.955	-1.084	-1.159	-1.213	-1.335	-1.452	-0.518

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.13	1	0.063	1.249	0.817	0.776	0.809	0.847	1.021	1.325	1.565
		0.188	1.088	0.698	0.645	0.661	0.685	0.799	1.030	1.217
		0.313	0.956	0.591	0.512	0.505	0.508	0.551	0.682	0.789
		0.438	0.822	0.485	0.379	0.350	0.333	0.309	0.341	0.374
		0.563	0.657	0.363	0.238	0.191	0.163	0.140	-0.229	-0.304
		0.688	0.439	0.212	0.114	-0.124	-0.161	-0.328	-0.562	-0.709
		0.813	0.178	-0.150	-0.271	-0.358	-0.419	-0.668	-0.988	-1.172
		0.938	-1.017	-1.108	-1.140	-1.195	-1.229	-1.359	-1.549	-1.670
	1.27	0.063	0.769	0.723	0.757	0.806	0.857	1.043	1.346	1.574
		0.188	0.669	0.615	0.629	0.660	0.692	0.816	1.047	1.222
		0.313	0.592	0.518	0.500	0.504	0.513	0.563	0.694	0.791
		0.438	0.514	0.422	0.371	0.349	0.336	0.315	0.347	0.374
		0.563	0.417	0.312	0.232	0.190	0.163	0.143	-0.231	-0.303
		0.688	0.280	0.177	0.113	-0.126	-0.166	-0.335	-0.566	-0.706
		0.813	0.117	-0.150	-0.269	-0.352	-0.433	-0.683	-0.994	-1.166
		0.938	-1.027	-1.063	-1.145	-1.202	-1.250	-1.377	-1.551	-1.660
	1.5	0.063	0.676	0.684	0.739	0.798	0.852	1.041	1.334	1.544
		0.188	0.586	0.580	0.614	0.653	0.687	0.815	1.037	1.197
		0.313	0.515	0.486	0.487	0.498	0.509	0.562	0.687	0.773
		0.438	0.445	0.394	0.359	0.344	0.332	0.314	0.344	0.366
		0.563	0.359	0.288	0.224	0.187	0.161	0.142	-0.227	-0.296
		0.688	0.237	0.161	0.109	-0.127	-0.166	-0.333	-0.557	-0.688
		0.813	0.102	-0.149	-0.269	-0.355	-0.433	-0.679	-0.978	-1.136
		0.938	-0.972	-1.028	-1.123	-1.193	-1.239	-1.360	-1.533	-1.615
	2	0.063	0.630	0.672	0.753	0.824	0.875	1.057	1.338	1.534
		0.188	0.542	0.572	0.627	0.673	0.705	0.827	1.040	1.186
		0.313	0.473	0.480	0.497	0.512	0.521	0.571	0.689	0.765
		0.438	0.406	0.389	0.368	0.351	0.338	0.320	0.345	0.361
		0.563	0.323	0.284	0.229	0.189	0.162	0.144	-0.226	-0.291
		0.688	0.210	0.157	0.113	-0.132	-0.173	-0.335	-0.554	-0.676
		0.813	0.096	-0.153	-0.271	-0.371	-0.450	-0.686	-0.972	-1.115
		0.938	-0.946	-1.042	-1.149	-1.217	-1.259	-1.366	-1.519	-1.583
	2.5	0.063	0.601	0.655	0.744	0.808	0.861	1.035	1.299	1.466
		0.188	0.520	0.558	0.618	0.659	0.693	0.809	1.009	1.132
		0.313	0.455	0.470	0.490	0.500	0.511	0.559	0.668	0.728
		0.438	0.391	0.381	0.361	0.342	0.331	0.314	0.334	0.343
		0.563	0.310	0.278	0.223	0.182	0.158	0.141	-0.218	-0.276
		0.688	0.198	0.153	0.110	-0.130	-0.170	-0.322	-0.534	-0.641
		0.813	0.090	-0.147	-0.270	-0.368	-0.443	-0.665	-0.938	-1.058
		0.938	-0.923	-1.011	-1.126	-1.184	-1.225	-1.318	-1.461	-1.499

1.09	1	0.063	1.064	0.783	0.765	0.804	0.847	1.025	1.335	1.575
		0.188	0.929	0.671	0.638	0.660	0.687	0.805	1.041	1.225
		0.313	0.826	0.572	0.510	0.508	0.514	0.559	0.691	0.794
		0.438	0.722	0.474	0.383	0.357	0.343	0.318	0.348	0.377
		0.563	0.596	0.362	0.248	0.202	0.174	0.140	-0.227	-0.303
		0.688	0.421	0.220	0.119	-0.117	-0.149	-0.317	-0.559	-0.706
		0.813	0.186	0.120	-0.236	-0.327	-0.393	-0.653	-0.983	-1.164
		0.938	-1.016	-1.057	-1.128	-1.198	-1.245	-1.389	-1.566	-1.662
	1.27	0.063	0.729	0.705	0.750	0.802	0.856	1.048	1.357	1.582
		0.188	0.637	0.602	0.626	0.659	0.694	0.823	1.057	1.228
		0.313	0.567	0.511	0.501	0.508	0.519	0.571	0.702	0.795
		0.438	0.498	0.421	0.377	0.357	0.344	0.324	0.353	0.377
		0.563	0.410	0.318	0.244	0.202	0.173	0.143	-0.229	-0.302
		0.688	0.283	0.188	0.117	-0.120	-0.153	-0.324	-0.562	-0.702
		0.813	0.110	0.120	-0.237	-0.325	-0.405	-0.666	-0.987	-1.155
		0.938	-0.966	-1.029	-1.139	-1.208	-1.263	-1.403	-1.563	-1.647
	1.5	0.063	0.653	0.672	0.734	0.798	0.855	1.045	1.344	1.552
		0.188	0.568	0.572	0.612	0.655	0.692	0.820	1.047	1.203
		0.313	0.503	0.483	0.489	0.504	0.516	0.569	0.695	0.778
		0.438	0.439	0.395	0.367	0.353	0.342	0.323	0.350	0.368
		0.563	0.360	0.296	0.236	0.199	0.171	0.143	-0.225	-0.294
		0.688	0.245	0.173	0.113	-0.119	-0.154	-0.321	-0.553	-0.684
		0.813	0.093	-0.118	-0.236	-0.327	-0.407	-0.661	-0.970	-1.124
		0.938	-0.920	-0.999	-1.112	-1.197	-1.251	-1.384	-1.545	-1.599
	2	0.063	0.619	0.667	0.753	0.823	0.876	1.063	1.347	1.542
		0.188	0.533	0.569	0.629	0.675	0.709	0.834	1.049	1.193
		0.313	0.469	0.482	0.503	0.518	0.528	0.579	0.696	0.769
		0.438	0.405	0.395	0.377	0.361	0.348	0.329	0.350	0.364
		0.563	0.328	0.295	0.241	0.201	0.172	0.145	-0.224	-0.290
		0.688	0.220	0.170	0.117	-0.123	-0.159	-0.322	-0.549	-0.672
		0.813	0.085	-0.122	-0.242	-0.341	-0.421	-0.667	-0.963	-1.103
		0.938	-0.902	-1.014	-1.143	-1.221	-1.269	-1.387	-1.526	-1.566
	2.5	0.063	0.595	0.657	0.747	0.809	0.863	1.040	1.307	1.474
		0.188	0.516	0.562	0.622	0.663	0.697	0.816	1.017	1.137
		0.313	0.455	0.477	0.496	0.507	0.518	0.567	0.675	0.732
		0.438	0.395	0.391	0.370	0.352	0.341	0.324	0.340	0.345
		0.563	0.318	0.291	0.236	0.194	0.168	0.142	-0.216	-0.275
		0.688	0.210	0.167	0.114	-0.121	-0.156	-0.309	-0.528	-0.636
		0.813	0.075	-0.124	-0.242	-0.338	-0.414	-0.646	-0.927	-1.044
		0.938	-0.889	-0.997	-1.119	-1.186	-1.231	-1.335	-1.465	-1.479

1.17	1	0.063	2.120	0.855	0.787	0.814	0.838	1.017	1.313	1.657
		0.188	1.849	0.729	0.652	0.663	0.676	0.794	1.019	1.216
		0.313	1.609	0.613	0.514	0.503	0.498	0.545	0.673	0.788
		0.438	1.357	0.497	0.376	0.343	0.322	0.302	0.335	0.373
		0.563	1.062	0.365	0.229	0.182	0.154	0.140	-0.230	-0.306
		0.688	0.692	0.206	0.112	-0.133	-0.168	-0.336	-0.563	-0.713
		0.813	0.278	-0.180	-0.301	-0.383	-0.426	-0.678	-0.987	-1.181
		0.938	-1.492	-1.147	-1.145	-1.185	-1.173	-1.329	-1.526	-1.675
	1.27	0.063	0.812	0.739	0.762	0.807	0.856	1.038	1.336	1.566
		0.188	0.705	0.627	0.632	0.659	0.689	0.810	1.037	1.215
		0.313	0.619	0.525	0.498	0.499	0.507	0.556	0.685	0.786
		0.438	0.533	0.423	0.364	0.341	0.327	0.308	0.341	0.372
		0.563	0.426	0.306	0.222	0.181	0.155	0.143	-0.233	-0.304
		0.688	0.279	0.167	0.111	-0.134	-0.177	-0.344	-0.569	-0.708
		0.813	0.129	-0.178	-0.295	-0.373	-0.453	-0.693	-0.996	-1.172
		0.938	-1.074	-1.084	-1.141	-1.186	-1.231	-1.349	-1.533	-1.661
	1.5	0.063	0.700	0.695	0.743	0.800	0.850	1.032	1.326	1.536
		0.188	0.605	0.588	0.615	0.652	0.684	0.806	1.029	1.190
		0.313	0.528	0.490	0.484	0.494	0.503	0.552	0.680	0.769
		0.438	0.452	0.392	0.353	0.337	0.323	0.306	0.338	0.363
		0.563	0.358	0.281	0.213	0.177	0.152	0.142	-0.229	-0.297
		0.688	0.230	0.151	0.107	-0.135	-0.177	-0.342	-0.561	-0.690
		0.813	0.117	-0.177	-0.295	-0.376	-0.454	-0.689	-0.981	-1.142
		0.938	-1.007	-1.046	-1.118	-1.178	-1.221	-1.333	-1.518	-1.618
	2	0.063	0.642	0.678	0.754	0.821	0.874	1.053	1.417	1.527
		0.188	0.550	0.575	0.626	0.668	0.702	0.821	1.038	1.181
		0.313	0.478	0.480	0.493	0.505	0.515	0.563	0.685	0.761
		0.438	0.406	0.384	0.360	0.342	0.329	0.312	0.341	0.359
		0.563	0.318	0.275	0.218	0.179	0.154	0.144	-0.229	-0.292
		0.688	0.200	0.146	0.111	-0.140	-0.185	-0.345	-0.561	-0.679
		0.813	0.113	-0.179	-0.294	-0.393	-0.471	-0.699	-0.981	-1.123
		0.938	-0.974	-1.051	-1.142	-1.204	-1.241	-1.344	-1.514	-1.589
	2.5	0.063	0.606	0.646	0.743	0.807	0.859	1.030	1.292	1.460
		0.188	0.523	0.551	0.615	0.656	0.689	0.803	1.001	1.128
		0.313	0.455	0.461	0.484	0.495	0.505	0.552	0.661	0.726
		0.438	0.387	0.370	0.352	0.334	0.321	0.306	0.329	0.342
		0.563	0.302	0.267	0.211	0.172	0.149	0.141	-0.220	-0.278
		0.688	0.187	0.145	0.109	-0.139	-0.182	-0.333	-0.538	-0.645
		0.813	0.107	-0.136	-0.294	-0.391	-0.465	-0.678	-0.943	-1.067
		0.938	-0.940	-0.936	-1.121	-1.173	-1.209	-1.299	-1.451	-1.507

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	$\bar{r}$/t	z/t	β							
1.19	1	0.063	*	0.875	0.793	0.816	0.848	1.013	1.308	1.652
		0.188	*	0.745	0.656	0.664	0.681	0.790	1.014	1.212
		0.313	*	0.624	0.515	0.502	0.500	0.541	0.669	0.785
		0.438	*	0.504	0.374	0.340	0.320	0.298	0.332	0.371
		0.563	*	0.366	0.225	0.178	0.150	-0.139	-0.230	-0.306
		0.688	*	0.203	0.113	-0.137	-0.178	-0.339	-0.564	-0.714
		0.813	*	-0.193	-0.315	-0.393	-0.463	-0.681	-0.986	-1.182
		0.938	*	-1.162	-1.146	-1.178	-1.197	-1.315	-1.515	-1.672
	1.27	0.063	0.836	0.748	0.765	0.799	0.856	1.036	1.331	1.561
		0.188	0.725	0.634	0.633	0.652	0.688	0.807	1.033	1.212
		0.313	0.635	0.529	0.497	0.492	0.505	0.552	0.681	0.783
		0.438	0.544	0.423	0.362	0.334	0.323	0.304	0.338	0.370
		0.563	0.432	0.304	0.217	0.175	0.151	-0.143	-0.233	-0.305
		0.688	0.280	0.163	0.111	-0.134	-0.182	-0.348	-0.570	-0.709
		0.813	0.138	-0.191	-0.307	-0.367	-0.462	-0.697	-0.995	-1.173
		0.938	-1.099	-1.093	-1.139	-1.135	-1.222	-1.335	-1.524	-1.659
	1.5	0.063	0.712	0.700	0.745	0.798	0.851	1.030	1.321	1.532
		0.188	0.615	0.592	0.616	0.650	0.683	0.802	1.025	1.187
		0.313	0.535	0.491	0.483	0.491	0.501	0.549	0.676	0.767
		0.438	0.456	0.391	0.350	0.332	0.320	0.302	0.336	0.362
		0.563	0.359	0.278	0.208	0.172	0.149	-0.142	-0.230	-0.297
		0.688	0.227	0.146	0.108	-0.138	-0.182	-0.346	-0.562	-0.691
		0.813	0.125	-0.190	-0.306	-0.385	-0.462	-0.693	-0.981	-1.144
		0.938	-1.023	-1.051	-1.116	-1.168	-1.211	-1.321	-1.509	-1.616
	2	0.063	0.647	0.681	0.753	0.820	0.871	1.050	1.412	1.523
		0.188	0.554	0.577	0.624	0.667	0.699	0.818	1.033	1.178
		0.313	0.480	0.480	0.490	0.502	0.511	0.560	0.682	0.759
		0.438	0.406	0.382	0.355	0.338	0.325	0.308	0.339	0.358
		0.563	0.316	0.271	0.212	0.174	0.150	-0.144	-0.230	-0.293
		0.688	0.196	0.142	0.111	-0.144	-0.190	-0.349	-0.562	-0.680
		0.813	0.122	-0.190	-0.304	-0.403	-0.479	-0.703	-0.982	-1.126
		0.938	-0.983	-1.052	-1.136	-1.196	-1.232	-1.332	-1.506	-1.590
	2.5	0.063	0.608	0.658	0.744	0.805	0.856	1.028	1.284	1.458
		0.188	0.524	0.556	0.615	0.654	0.686	0.800	0.995	1.125
		0.313	0.455	0.461	0.482	0.492	0.501	0.548	0.656	0.724
		0.438	0.384	0.366	0.348	0.329	0.317	0.303	0.326	0.341
		0.563	0.298	0.257	0.207	0.168	0.146	0.141	-0.220	-0.278
		0.688	0.182	0.134	0.109	-0.143	-0.188	-0.337	-0.538	-0.646
		0.813	0.117	-0.186	-0.304	-0.400	-0.474	-0.683	-0.941	-1.070
		0.938	-0.945	-1.013	-1.116	-1.167	-1.202	-1.289	-1.441	-1.509

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
2	1	0.063	*	*	1.300	0.958	0.901	0.939	1.161	1.386
		0.188	*	*	1.036	0.751	0.698	0.716	0.880	1.065
		0.313	*	*	0.752	0.524	0.477	0.468	0.562	0.681
		0.438	*	*	0.470	0.302	0.262	0.233	0.264	0.316
		0.563	*	*	0.211	0.132	-0.124	-0.150	-0.221	-0.287
		0.688	*	*	-0.288	-0.285	-0.302	-0.374	-0.519	-0.655
		0.813	*	*	-0.716	-0.615	-0.609	-0.675	-0.872	-1.066
		0.938	*	*	-1.486	-1.138	-1.056	-1.052	-1.237	-1.443
	1.27	0.063	*	1.488	0.942	0.864	0.858	0.951	1.178	1.409
		0.188	*	1.234	0.748	0.675	0.666	0.725	0.894	1.083
		0.313	*	0.951	0.538	0.469	0.455	0.473	0.570	0.692
		0.438	*	0.673	0.329	0.268	0.250	0.236	0.268	0.321
		0.563	*	0.399	0.145	0.119	-0.118	-0.153	-0.224	-0.291
		0.688	*	0.176	-0.238	-0.267	-0.287	-0.381	-0.526	-0.664
		0.813	*	-0.341	-0.571	-0.569	-0.581	-0.686	-0.885	-1.081
		0.938	*	-0.967	-1.158	-1.042	-1.021	-1.066	-1.254	-1.464
	1.5	0.063	*	1.167	0.843	0.819	0.833	0.949	1.167	1.387
		0.188	*	0.948	0.667	0.637	0.646	0.724	0.884	1.066
		0.313	*	0.721	0.478	0.442	0.441	0.472	0.565	0.682
		0.438	*	0.493	0.291	0.251	0.241	0.235	0.266	0.316
		0.563	*	0.260	0.127	0.112	-0.115	-0.153	-0.222	-0.286
		0.688	*	-0.191	-0.221	-0.256	-0.282	-0.382	-0.520	-0.653
		0.813	*	-0.569	-0.523	-0.544	-0.568	-0.686	-0.875	-1.063
		0.938	*	-1.417	-1.053	-0.991	-0.992	-1.061	-1.240	-1.440
	2	0.063	1.102	0.837	0.788	0.804	0.832	0.966	1.191	1.392
		0.188	0.907	0.674	0.618	0.629	0.647	0.736	0.902	1.069
		0.313	0.716	0.508	0.442	0.437	0.442	0.480	0.577	0.684
		0.438	0.523	0.341	0.266	0.249	0.243	0.238	0.271	0.317
		0.563	0.314	0.172	0.116	0.111	-0.115	-0.157	-0.225	-0.286
		0.688	0.159	-0.158	-0.213	-0.251	-0.280	-0.390	-0.530	-0.654
		0.813	-0.467	-0.454	-0.496	-0.535	-0.563	-0.700	-0.890	-1.064
		0.938	-1.396	-1.101	-0.991	-0.985	-0.999	-1.079	-1.261	-1.442
	2.5	0.063	0.804	0.742	0.748	0.778	0.816	0.947	1.165	1.347
		0.188	0.656	0.593	0.592	0.610	0.633	0.721	0.884	1.033
		0.313	0.516	0.446	0.424	0.425	0.432	0.470	0.565	0.660
		0.438	0.372	0.297	0.257	0.244	0.236	0.233	0.266	0.306
		0.563	0.216	0.147	0.112	0.107	-0.113	-0.154	-0.220	-0.276
		0.688	-0.121	-0.146	-0.200	-0.238	-0.276	-0.383	-0.517	-0.631
		0.813	-0.375	-0.411	-0.472	-0.509	-0.555	-0.687	-0.870	-1.026
		0.938	-1.096	-0.990	-0.952	-0.960	-0.978	-1.056	-1.233	-1.391

1.21	1	0.063	*	0.898	0.799	0.818	0.849	1.010	1.303	1.648
		0.188	*	0.764	0.659	0.665	0.681	0.787	1.010	1.209
		0.313	*	0.638	0.516	0.501	0.498	0.537	0.665	0.782
		0.438	*	0.512	0.373	0.338	0.317	0.295	0.329	0.370
		0.563	*	0.369	0.222	0.174	0.147	-0.140	-0.231	-0.307
		0.688	*	0.202	0.113	-0.141	-0.183	-0.343	-0.564	-0.714
		0.813	*	-0.208	-0.327	-0.403	-0.471	-0.684	-0.984	-1.182
		0.938	*	-1.181	-1.147	-1.173	-1.189	-1.302	-1.504	-1.668
	1.27	0.063	0.862	0.756	0.767	0.809	0.857	1.030	1.323	1.552
		0.188	0.745	0.640	0.634	0.657	0.688	0.802	1.025	1.205
		0.313	0.650	0.531	0.496	0.494	0.503	0.548	0.675	0.779
		0.438	0.554	0.423	0.358	0.331	0.320	0.300	0.334	0.368
		0.563	0.437	0.301	0.213	0.169	0.148	-0.143	-0.233	-0.304
		0.688	0.279	0.158	0.111	-0.143	-0.187	-0.351	-0.568	-0.707
		0.813	0.146	-0.204	-0.317	-0.409	-0.470	-0.699	-0.991	-1.170
		0.938	-1.118	-1.099	-1.136	-1.167	-1.212	-1.321	-1.511	-1.651
	1.5	0.063	0.724	0.706	0.749	0.798	0.850	1.027	1.317	1.528
		0.188	0.624	0.596	0.618	0.649	0.682	0.799	1.021	1.184
		0.313	0.542	0.493	0.483	0.488	0.498	0.546	0.672	0.764
		0.438	0.460	0.390	0.348	0.328	0.316	0.299	0.333	0.361
		0.563	0.359	0.274	0.205	0.168	0.146	-0.142	-0.230	-0.297
		0.688	0.223	0.142	0.109	-0.142	-0.187	-0.349	-0.562	-0.692
		0.813	0.134	-0.202	-0.318	-0.394	-0.470	-0.696	-0.980	-1.145
		0.938	-1.036	-1.056	-1.117	-1.161	-1.202	-1.309	-1.499	-1.615
	2	0.063	0.653	0.684	0.753	0.819	0.870	1.047	1.408	1.519
		0.188	0.559	0.579	0.623	0.665	0.697	0.815	1.030	1.175
		0.313	0.482	0.480	0.488	0.499	0.508	0.556	0.678	0.757
		0.438	0.405	0.380	0.351	0.334	0.321	0.305	0.336	0.357
		0.563	0.313	0.266	0.207	0.170	0.147	-0.145	-0.231	-0.293
		0.688	0.191	0.137	0.112	-0.148	-0.195	-0.354	-0.563	-0.681
		0.813	-0.131	-0.200	-0.313	-0.411	-0.487	-0.707	-0.982	-1.128
		0.938	-0.992	-1.053	-1.132	-1.189	-1.222	-1.320	-1.498	-1.589
	2.5	0.063	0.612	0.659	0.743	0.804	0.855	1.025	1.280	1.455
		0.188	0.526	0.556	0.614	0.652	0.684	0.797	0.991	1.123
		0.313	0.455	0.459	0.479	0.489	0.498	0.545	0.653	0.723
		0.438	0.383	0.362	0.344	0.325	0.313	0.299	0.324	0.340
		0.563	0.295	0.253	0.201	0.163	0.142	-0.141	-0.221	-0.279
		0.688	0.177	0.129	0.110	-0.148	-0.193	-0.341	-0.540	-0.648
		0.813	-0.125	-0.197	-0.314	-0.409	-0.482	-0.686	-0.942	-1.072
		0.938	-0.951	-1.013	-1.111	-1.159	-1.193	-1.279	-1.434	-1.510

3	1	0.063	*	*	*	2.252	1.176	0.917	1.057	1.250
		0.188	*	*	*	1.742	0.899	0.692	0.795	0.948
		0.313	*	*	*	1.187	0.596	0.443	0.500	0.599
		0.438	*	*	*	0.654	0.306	0.212	0.230	0.274
		0.563	*	*	*	0.294	-0.173	-0.160	-0.205	-0.258
		0.688	*	*	*	-0.681	-0.436	-0.386	-0.474	-0.584
		0.813	*	*	*	-1.357	-0.811	-0.668	-0.788	-0.947
		0.938	*	*	*	-2.244	-1.274	-0.977	-1.095	-1.279
	1.27	0.063	*	*	2.286	1.109	0.943	0.900	1.077	1.270
		0.188	*	*	1.827	0.852	0.719	0.679	0.809	0.963
		0.313	*	*	1.300	0.572	0.474	0.435	0.509	0.609
		0.438	*	*	0.793	0.302	0.242	0.208	0.234	0.278
		0.563	*	*	0.347	-0.157	-0.143	-0.158	-0.209	-0.262
		0.688	*	*	-0.416	-0.394	-0.359	-0.380	-0.483	-0.593
		0.813	*	*	-0.948	-0.756	-0.664	-0.658	-0.802	-0.962
		0.938	*	*	-1.763	-1.229	-1.039	-0.960	-1.115	-1.298
	1.5	0.063	*	*	1.294	0.931	0.969	0.885	1.072	1.260
		0.188	*	*	1.003	0.712	0.740	0.669	0.805	0.955
		0.313	*	*	0.690	0.477	0.489	0.428	0.506	0.604
		0.438	*	*	0.385	0.250	0.249	0.205	0.233	0.276
		0.563	*	*	0.174	-0.134	-0.147	-0.155	-0.209	-0.260
		0.688	*	*	-0.408	-0.338	-0.370	-0.373	-0.482	-0.588
		0.813	*	*	-0.835	-0.644	-0.681	-0.646	-0.799	-0.953
		0.938	*	*	-1.444	-1.044	-1.078	-0.947	-1.109	-1.287
	2	0.063	*	1.990	0.904	0.835	0.826	0.903	1.091	1.283
		0.188	*	1.569	0.694	0.634	0.630	0.682	0.819	0.973
		0.313	*	1.131	0.474	0.423	0.415	0.436	0.515	0.615
		0.438	*	0.698	0.260	0.220	0.211	0.208	0.237	0.281
		0.563	*	0.308	-0.124	-0.122	-0.126	-0.158	-0.212	-0.265
		0.688	*	-0.451	-0.303	-0.308	-0.318	-0.382	-0.489	-0.599
		0.813	*	-1.079	-0.608	-0.581	-0.587	-0.660	-0.812	-0.970
		0.938	*	-2.126	-1.045	-0.942	-0.920	-0.965	-1.128	-1.310
	2.5	0.063	*	0.987	0.797	0.778	0.787	0.883	1.066	1.317
		0.188	*	0.768	0.607	0.597	0.599	0.667	0.800	0.943
		0.313	*	0.547	0.413	0.399	0.394	0.427	0.503	0.596
		0.438	*	0.326	0.225	0.209	0.200	0.203	0.231	0.273
		0.563	*	0.141	-0.109	-0.113	-0.121	-0.156	-0.206	-0.256
		0.688	*	-0.271	-0.271	-0.286	-0.304	-0.375	-0.477	-0.580
		0.813	*	-0.612	-0.537	-0.545	-0.560	-0.646	-0.792	-0.940
		0.938	*	-1.190	-0.927	-0.884	-0.875	-0.943	-1.101	-1.268

* Crack Length outside FEM geometry

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
5	1	0.063	*	*	*	*	*	1.026	0.961	1.108
		0.188	*	*	*	*	*	0.768	0.719	0.830
		0.313	*	*	*	*	*	0.485	0.448	0.517
		0.438	*	*	*	*	*	0.225	0.203	0.234
		0.563	*	*	*	*	*	-0.190	-0.190	-0.226
		0.688	*	*	*	*	*	-0.446	-0.434	-0.510
		0.813	*	*	*	*	*	-0.751	-0.714	-0.829
		0.938	*	*	*	*	*	-1.057	-0.978	-1.120
	1.27	0.063	*	*	*	*	3.744	0.916	0.972	1.130
		0.188	*	*	*	*	2.886	0.684	0.727	0.847
		0.313	*	*	*	*	1.905	0.431	0.453	0.528
		0.438	*	*	*	*	0.988	0.200	0.206	0.238
		0.563	*	*	*	*	-0.494	-0.171	-0.193	-0.231
		0.688	*	*	*	*	-1.192	-0.400	-0.439	-0.520
		0.813	*	*	*	*	-2.177	-0.671	-0.723	-0.845
		0.938	*	*	*	*	-3.281	-0.946	-0.990	-1.142
	1.5	0.063	*	*	*	*	1.364	0.879	0.970	1.121
		0.188	*	*	*	*	1.025	0.660	0.725	0.840
		0.313	*	*	*	*	0.660	0.416	0.452	0.524
		0.438	*	*	*	*	0.319	0.193	0.205	0.237
		0.563	*	*	*	*	-0.228	-0.166	-0.192	-0.229
		0.688	*	*	*	*	-0.555	-0.387	-0.439	-0.516
		0.813	*	*	*	*	-0.968	-0.649	-0.721	-0.839
		0.938	*	*	*	*	-1.423	-0.907	-0.986	-1.133
	2	0.063	*	*	*	1.166	0.938	0.847	0.986	1.141
		0.188	*	*	*	0.874	0.700	0.634	0.737	0.854
		0.313	*	*	*	0.567	0.449	0.400	0.460	0.533
		0.438	*	*	*	0.278	0.215	0.185	0.208	0.241
		0.563	*	*	*	-0.189	-0.160	-0.158	-0.196	-0.233
		0.688	*	*	*	-0.466	-0.388	-0.371	-0.446	-0.525
		0.813	*	*	*	-0.824	-0.672	-0.623	-0.733	-0.852
		0.938	*	*	*	-1.240	-0.991	-0.877	-1.003	-1.153
	2.5	0.063	*	*	1.262	0.894	0.825	0.818	0.966	1.113
		0.188	*	*	0.945	0.664	0.610	0.614	0.722	0.833
		0.313	*	*	0.621	0.430	0.391	0.387	0.450	0.520
		0.438	*	*	0.313	0.209	0.187	0.180	0.204	0.235
		0.563	*	*	-0.191	-0.147	-0.141	-0.153	-0.192	-0.227
		0.688	*	*	-0.479	-0.360	-0.341	-0.358	-0.438	-0.512
		0.813	*	*	-0.869	-0.632	-0.588	-0.602	-0.718	-0.831
		0.938	*	*	-1.361	-0.957	-0.873	-0.848	-0.983	-1.124

* Crack Length outside FEM geometry

Pin Loading ($Cos^2\theta$ Load Distribution)

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.05	1	0.063	0.382	0.299	0.314	0.353	0.392	0.541	0.746	0.870
		0.188	0.352	0.280	0.298	0.341	0.383	0.544	0.762	0.890
		0.313	0.341	0.272	0.290	0.333	0.376	0.542	0.766	0.894
		0.438	0.340	0.274	0.292	0.334	0.378	0.547	0.773	0.898
		0.563	0.342	0.283	0.304	0.346	0.390	0.561	0.783	0.901
		0.688	0.350	0.305	0.333	0.376	0.422	0.592	0.801	0.903
		0.813	0.349	0.334	0.382	0.428	0.476	0.646	0.829	0.901
		0.938	0.544	0.633	0.686	0.777	0.826	0.923	0.947	0.930
	1.27	0.063	0.282	0.287	0.336	0.385	0.432	0.596	0.798	0.913
		0.188	0.265	0.270	0.320	0.373	0.423	0.598	0.811	0.928
		0.313	0.262	0.265	0.314	0.366	0.416	0.596	0.812	0.928
		0.438	0.269	0.270	0.317	0.369	0.418	0.600	0.816	0.929
		0.563	0.282	0.284	0.332	0.383	0.432	0.614	0.824	0.930
		0.688	0.305	0.313	0.366	0.419	0.467	0.646	0.840	0.931
		0.813	0.331	0.355	0.420	0.477	0.527	0.703	0.866	0.928
		0.938	0.640	0.707	0.805	0.866	0.909	0.992	0.988	0.955
	1.5	0.063	0.267	0.292	0.352	0.412	0.466	0.634	0.827	0.934
		0.188	0.251	0.275	0.338	0.399	0.455	0.636	0.839	0.947
		0.313	0.250	0.271	0.332	0.392	0.448	0.633	0.837	0.944
		0.438	0.260	0.278	0.337	0.396	0.450	0.637	0.840	0.943
		0.563	0.276	0.295	0.354	0.411	0.465	0.651	0.847	0.943
		0.688	0.305	0.328	0.393	0.450	0.502	0.683	0.862	0.942
		0.813	0.340	0.376	0.447	0.512	0.566	0.742	0.887	0.938
		0.938	0.692	0.761	0.844	0.926	0.969	1.036	1.009	0.963
	2	0.063	0.268	0.309	0.394	0.467	0.525	0.692	0.873	0.963
		0.188	0.253	0.293	0.378	0.453	0.513	0.693	0.884	0.973
		0.313	0.254	0.292	0.372	0.445	0.504	0.688	0.882	0.968
		0.438	0.266	0.303	0.379	0.449	0.507	0.692	0.883	0.964
		0.563	0.287	0.324	0.400	0.466	0.523	0.706	0.888	0.961
		0.688	0.326	0.366	0.444	0.509	0.563	0.738	0.902	0.958
		0.813	0.372	0.421	0.510	0.578	0.633	0.799	0.925	0.951
		0.938	0.793	0.859	0.970	1.033	1.067	1.104	1.043	0.972
	2.5	0.063	0.278	0.330	0.434	0.512	0.574	0.739	0.909	0.980
		0.188	0.264	0.315	0.416	0.496	0.561	0.738	0.919	0.988
		0.313	0.268	0.316	0.410	0.487	0.551	0.733	0.916	0.981
		0.438	0.283	0.330	0.418	0.492	0.553	0.735	0.915	0.975
		0.563	0.308	0.355	0.440	0.510	0.570	0.749	0.919	0.971
		0.688	0.353	0.404	0.488	0.555	0.611	0.780	0.931	0.966
		0.813	0.405	0.470	0.560	0.629	0.685	0.843	0.953	0.956
		0.938	0.874	0.956	1.056	1.111	1.141	1.154	1.068	0.964

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
1.13	1	0.063	0.503	0.312	0.311	0.345	0.380	0.523	0.732	0.861
		0.188	0.456	0.293	0.299	0.336	0.375	0.530	0.750	0.881
		0.313	0.430	0.285	0.292	0.331	0.370	0.531	0.755	0.886
		0.438	0.414	0.286	0.295	0.333	0.373	0.537	0.762	0.890
		0.563	0.401	0.295	0.306	0.346	0.385	0.551	0.774	0.894
		0.688	0.392	0.314	0.332	0.374	0.414	0.580	0.792	0.900
		0.813	0.368	0.346	0.380	0.426	0.465	0.632	0.824	0.908
		0.938	0.424	0.583	0.643	0.691	0.724	0.827	0.917	0.944
	1.27	0.063	0.300	0.289	0.329	0.375	0.418	0.579	0.785	0.904
		0.188	0.282	0.273	0.316	0.366	0.413	0.585	0.801	0.920
		0.313	0.278	0.269	0.311	0.361	0.409	0.586	0.804	0.921
		0.438	0.285	0.274	0.316	0.365	0.413	0.592	0.809	0.923
		0.563	0.296	0.288	0.331	0.379	0.427	0.606	0.819	0.925
		0.688	0.317	0.315	0.361	0.411	0.460	0.637	0.837	0.929
		0.813	0.345	0.360	0.417	0.467	0.519	0.692	0.869	0.938
		0.938	0.596	0.644	0.717	0.766	0.805	0.900	0.963	0.976
	1.5	0.063	0.273	0.290	0.345	0.399	0.449	0.620	0.817	0.927
		0.188	0.257	0.275	0.333	0.391	0.444	0.626	0.830	0.941
		0.313	0.257	0.272	0.328	0.386	0.439	0.626	0.831	0.940
		0.438	0.266	0.279	0.334	0.391	0.444	0.631	0.835	0.940
		0.563	0.282	0.296	0.350	0.407	0.460	0.646	0.843	0.941
		0.688	0.309	0.327	0.384	0.443	0.495	0.677	0.860	0.945
		0.813	0.349	0.380	0.446	0.505	0.558	0.735	0.892	0.953
		0.938	0.642	0.691	0.767	0.824	0.862	0.948	0.992	0.991
	2	0.063	0.269	0.308	0.384	0.456	0.509	0.676	0.862	0.957
		0.188	0.254	0.293	0.372	0.446	0.502	0.682	0.877	0.968
		0.313	0.255	0.293	0.368	0.440	0.497	0.681	0.876	0.964
		0.438	0.267	0.303	0.376	0.446	0.502	0.687	0.878	0.961
		0.563	0.288	0.324	0.396	0.464	0.519	0.703	0.886	0.961
		0.688	0.323	0.363	0.436	0.503	0.557	0.735	0.903	0.963
		0.813	0.376	0.425	0.504	0.573	0.628	0.796	0.935	0.969
		0.938	0.728	0.792	0.874	0.928	0.959	1.020	1.033	1.005
	2.5	0.063	0.277	0.328	0.424	0.499	0.559	0.725	0.900	0.976
		0.188	0.265	0.314	0.410	0.488	0.551	0.729	0.913	0.985
		0.313	0.268	0.314	0.406	0.482	0.546	0.728	0.912	0.979
		0.438	0.283	0.327	0.414	0.488	0.551	0.733	0.913	0.975
		0.563	0.308	0.352	0.437	0.508	0.569	0.748	0.919	0.973
		0.688	0.349	0.396	0.481	0.550	0.609	0.781	0.935	0.974
		0.813	0.409	0.464	0.556	0.627	0.685	0.845	0.966	0.978
		0.938	0.811	0.870	0.958	1.005	1.035	1.075	1.065	1.013

1.09	1	0.063	0.429	0.305	0.314	0.350	0.386	0.531	0.765	0.866
		0.188	0.393	0.286	0.300	0.339	0.380	0.537	0.782	0.885
		0.313	0.378	0.278	0.292	0.333	0.374	0.537	0.787	0.890
		0.438	0.372	0.280	0.294	0.335	0.377	0.542	0.794	0.894
		0.563	0.370	0.289	0.305	0.347	0.389	0.557	0.805	0.897
		0.688	0.372	0.309	0.332	0.376	0.419	0.587	0.824	0.902
		0.813	0.365	0.340	0.382	0.430	0.472	0.641	0.857	0.906
		0.938	0.520	0.606	0.677	0.734	0.772	0.872	0.966	0.942
	1.27	0.063	0.290	0.287	0.332	0.379	0.424	0.587	0.792	0.907
		0.188	0.272	0.271	0.318	0.369	0.417	0.592	0.806	0.923
		0.313	0.270	0.266	0.312	0.363	0.412	0.591	0.808	0.923
		0.438	0.276	0.272	0.317	0.367	0.415	0.597	0.813	0.924
		0.563	0.289	0.286	0.332	0.382	0.430	0.611	0.822	0.926
		0.688	0.311	0.314	0.364	0.416	0.464	0.643	0.839	0.929
		0.813	0.339	0.359	0.420	0.474	0.525	0.700	0.870	0.934
		0.938	0.618	0.676	0.760	0.814	0.854	0.944	0.976	0.970
	1.5	0.063	0.269	0.291	0.349	0.406	0.458	0.626	0.822	0.931
		0.188	0.253	0.275	0.335	0.395	0.450	0.631	0.835	0.944
		0.313	0.253	0.271	0.330	0.389	0.445	0.629	0.834	0.942
		0.438	0.262	0.278	0.335	0.394	0.449	0.635	0.838	0.942
		0.563	0.278	0.295	0.352	0.410	0.464	0.649	0.846	0.942
		0.688	0.307	0.328	0.387	0.447	0.500	0.681	0.862	0.944
		0.813	0.345	0.379	0.448	0.510	0.565	0.741	0.892	0.948
		0.938	0.668	0.727	0.809	0.872	0.913	0.991	1.004	0.983
	2	0.063	0.268	0.309	0.389	0.461	0.516	0.684	0.867	0.961
		0.188	0.253	0.294	0.375	0.449	0.507	0.687	0.880	0.971
		0.313	0.254	0.293	0.371	0.443	0.501	0.685	0.879	0.967
		0.438	0.266	0.304	0.378	0.448	0.505	0.690	0.880	0.963
		0.563	0.287	0.326	0.399	0.466	0.522	0.705	0.887	0.962
		0.688	0.324	0.366	0.441	0.507	0.561	0.738	0.903	0.962
		0.813	0.374	0.426	0.509	0.578	0.633	0.800	0.932	0.963
		0.938	0.762	0.830	0.921	0.978	1.011	1.061	1.042	0.997
	2.5	0.063	0.278	0.330	0.430	0.505	0.567	0.731	0.903	0.979
		0.188	0.264	0.316	0.414	0.492	0.556	0.734	0.915	0.987
		0.313	0.268	0.316	0.409	0.485	0.549	0.731	0.912	0.981
		0.438	0.283	0.329	0.418	0.490	0.553	0.735	0.913	0.976
		0.563	0.308	0.354	0.440	0.510	0.571	0.750	0.919	0.973
		0.688	0.351	0.400	0.486	0.554	0.611	0.782	0.933	0.971
		0.813	0.409	0.468	0.560	0.631	0.688	0.847	0.961	0.970
		0.938	0.848	0.914	1.007	1.057	1.087	1.114	1.070	1.000

1.17	1	0.063	0.713	0.322	0.312	0.342	0.370	0.516	0.725	0.908
		0.188	0.642	0.302	0.299	0.334	0.366	0.524	0.744	0.876
		0.313	0.591	0.293	0.293	0.329	0.362	0.526	0.749	0.880
		0.438	0.548	0.294	0.295	0.332	0.366	0.532	0.756	0.884
		0.563	0.506	0.302	0.306	0.344	0.377	0.546	0.768	0.889
		0.688	0.470	0.319	0.330	0.370	0.404	0.573	0.786	0.894
		0.813	0.422	0.350	0.378	0.421	0.450	0.622	0.817	0.903
		0.938	0.381	0.564	0.608	0.655	0.670	0.790	0.898	0.938
	1.27	0.063	0.312	0.290	0.325	0.369	0.411	0.571	0.779	0.900
		0.188	0.293	0.275	0.314	0.362	0.407	0.579	0.796	0.917
		0.313	0.289	0.271	0.310	0.358	0.404	0.580	0.800	0.918
		0.438	0.294	0.276	0.314	0.362	0.409	0.587	0.805	0.920
		0.563	0.305	0.289	0.329	0.377	0.423	0.602	0.815	0.923
		0.688	0.323	0.315	0.358	0.408	0.455	0.630	0.833	0.929
		0.813	0.351	0.360	0.412	0.462	0.511	0.683	0.865	0.940
		0.938	0.578	0.616	0.680	0.728	0.763	0.862	0.948	0.976
	1.5	0.063	0.278	0.290	0.342	0.394	0.442	0.610	0.813	0.924
		0.188	0.263	0.276	0.331	0.387	0.438	0.617	0.827	0.939
		0.313	0.262	0.273	0.327	0.383	0.435	0.618	0.829	0.938
		0.438	0.270	0.279	0.332	0.388	0.440	0.625	0.833	0.938
		0.563	0.286	0.296	0.348	0.404	0.456	0.640	0.842	0.940
		0.688	0.311	0.326	0.380	0.438	0.490	0.669	0.859	0.944
		0.813	0.351	0.378	0.440	0.497	0.550	0.724	0.891	0.955
		0.938	0.619	0.659	0.727	0.781	0.819	0.910	0.980	0.992
	2	0.063	0.269	0.306	0.380	0.448	0.502	0.670	0.910	0.955
		0.188	0.255	0.293	0.369	0.439	0.497	0.677	0.873	0.967
		0.313	0.256	0.292	0.366	0.435	0.493	0.677	0.872	0.963
		0.438	0.268	0.302	0.373	0.441	0.499	0.684	0.874	0.960
		0.563	0.288	0.323	0.393	0.459	0.516	0.699	0.882	0.961
		0.688	0.322	0.360	0.431	0.497	0.553	0.730	0.899	0.964
		0.813	0.376	0.421	0.496	0.566	0.620	0.789	0.930	0.974
		0.938	0.697	0.755	0.829	0.882	0.913	0.984	1.019	1.010
	2.5	0.063	0.276	0.321	0.419	0.493	0.553	0.718	0.897	0.975
		0.188	0.264	0.309	0.406	0.483	0.547	0.725	0.911	0.984
		0.313	0.268	0.309	0.403	0.479	0.543	0.724	0.910	0.979
		0.438	0.283	0.320	0.412	0.485	0.548	0.730	0.913	0.975
		0.563	0.307	0.342	0.434	0.505	0.566	0.746	0.920	0.974
		0.688	0.346	0.382	0.476	0.545	0.605	0.777	0.936	0.976
		0.813	0.407	0.439	0.550	0.620	0.678	0.838	0.967	0.985
		0.938	0.775	0.787	0.914	0.958	0.989	1.039	1.056	1.019

a/t	r/t	z/t	β (a/c = 0.3)	0.4	0.6	0.8	1	2	5	10
1.19	1	0.063	*	0.327	0.311	0.340	0.371	0.511	0.722	0.906
		0.188	*	0.307	0.299	0.333	0.368	0.520	0.741	0.874
		0.313	*	0.298	0.293	0.328	0.365	0.522	0.746	0.878
		0.438	*	0.298	0.295	0.331	0.368	0.528	0.754	0.883
		0.563	*	0.305	0.306	0.343	0.381	0.542	0.765	0.887
		0.688	*	0.321	0.329	0.369	0.407	0.569	0.783	0.892
		0.813	*	0.351	0.377	0.418	0.458	0.616	0.814	0.903
		0.938	*	0.553	0.595	0.638	0.665	0.772	0.889	0.935
	1.27	0.063	0.320	0.292	0.324	0.363	0.408	0.568	0.777	0.898
		0.188	0.300	0.277	0.314	0.357	0.405	0.576	0.794	0.915
		0.313	0.295	0.272	0.309	0.353	0.402	0.578	0.797	0.917
		0.438	0.300	0.277	0.314	0.356	0.407	0.584	0.803	0.919
		0.563	0.310	0.290	0.328	0.369	0.422	0.599	0.813	0.922
		0.688	0.328	0.315	0.356	0.398	0.452	0.627	0.831	0.928
		0.813	0.355	0.360	0.410	0.448	0.507	0.678	0.862	0.939
		0.938	0.573	0.605	0.665	0.689	0.745	0.845	0.941	0.975
	1.5	0.063	0.281	0.291	0.340	0.391	0.440	0.606	0.810	0.922
		0.188	0.266	0.276	0.330	0.384	0.436	0.614	0.825	0.937
		0.313	0.264	0.273	0.326	0.380	0.433	0.616	0.827	0.936
		0.438	0.272	0.280	0.331	0.386	0.439	0.622	0.831	0.937
		0.563	0.288	0.296	0.347	0.401	0.454	0.637	0.840	0.939
		0.688	0.313	0.325	0.379	0.434	0.487	0.666	0.858	0.944
		0.813	0.353	0.378	0.438	0.492	0.546	0.719	0.889	0.956
		0.938	0.610	0.646	0.710	0.760	0.799	0.893	0.972	0.991
	2	0.063	0.270	0.306	0.377	0.445	0.497	0.667	0.908	0.954
		0.188	0.256	0.293	0.367	0.437	0.493	0.674	0.871	0.965
		0.313	0.257	0.292	0.363	0.434	0.490	0.675	0.871	0.962
		0.438	0.268	0.302	0.371	0.440	0.496	0.682	0.873	0.960
		0.563	0.288	0.322	0.390	0.458	0.513	0.697	0.881	0.961
		0.688	0.322	0.358	0.428	0.495	0.549	0.728	0.898	0.965
		0.813	0.376	0.419	0.492	0.562	0.616	0.785	0.930	0.975
		0.938	0.683	0.738	0.809	0.862	0.893	0.967	1.013	1.011
	2.5	0.063	0.276	0.326	0.417	0.489	0.548	0.715	0.892	0.974
		0.188	0.264	0.312	0.405	0.480	0.543	0.722	0.907	0.984
		0.313	0.267	0.312	0.402	0.476	0.539	0.723	0.907	0.979
		0.438	0.282	0.324	0.411	0.483	0.545	0.728	0.909	0.976
		0.563	0.306	0.347	0.432	0.503	0.563	0.744	0.916	0.975
		0.688	0.345	0.388	0.474	0.543	0.601	0.775	0.933	0.978
		0.813	0.406	0.458	0.546	0.616	0.674	0.835	0.964	0.987
		0.938	0.758	0.807	0.893	0.937	0.968	1.023	1.047	1.021

a/t	r/t	z/t	β (a/c = 0.3)	0.4	0.6	0.8	1	2	5	10
2	1	0.063	*	*	0.417	0.329	0.327	0.410	0.614	0.765
		0.188	*	*	0.407	0.329	0.332	0.424	0.638	0.790
		0.313	*	*	0.395	0.327	0.332	0.428	0.645	0.796
		0.438	*	*	0.388	0.328	0.334	0.432	0.651	0.800
		0.563	*	*	0.386	0.332	0.340	0.438	0.656	0.804
		0.688	*	*	0.391	0.342	0.350	0.447	0.663	0.809
		0.813	*	*	0.409	0.363	0.369	0.461	0.671	0.813
		0.938	*	*	0.476	0.417	0.413	0.488	0.673	0.807
	1.27	0.063	*	0.954	0.330	0.325	0.343	0.456	0.668	0.819
		0.188	*	0.883	0.327	0.328	0.349	0.471	0.692	0.843
		0.313	*	0.800	0.324	0.328	0.350	0.476	0.699	0.847
		0.438	*	0.726	0.324	0.330	0.354	0.481	0.704	0.850
		0.563	*	0.659	0.330	0.337	0.360	0.488	0.710	0.853
		0.688	*	0.600	0.343	0.349	0.373	0.498	0.718	0.858
		0.813	*	0.540	0.370	0.374	0.394	0.513	0.727	0.865
		0.938	*	0.521	0.442	0.429	0.448	0.543	0.730	0.861
	1.5	0.063	*	0.403	0.320	0.335	0.363	0.495	0.704	0.848
		0.188	*	0.388	0.318	0.338	0.369	0.511	0.728	0.871
		0.313	*	0.378	0.317	0.338	0.371	0.516	0.735	0.873
		0.438	*	0.374	0.319	0.342	0.375	0.521	0.740	0.876
		0.563	*	0.377	0.327	0.350	0.383	0.528	0.746	0.879
		0.688	*	0.389	0.342	0.364	0.396	0.539	0.755	0.885
		0.813	*	0.419	0.371	0.390	0.420	0.555	0.764	0.892
		0.938	*	0.519	0.444	0.447	0.476	0.587	0.768	0.890
	2	0.063	0.388	0.314	0.330	0.367	0.403	0.555	0.768	0.896
		0.188	0.371	0.307	0.330	0.371	0.411	0.573	0.794	0.919
		0.313	0.362	0.304	0.330	0.372	0.413	0.578	0.801	0.922
		0.438	0.362	0.307	0.334	0.377	0.418	0.584	0.805	0.923
		0.563	0.370	0.318	0.344	0.386	0.427	0.592	0.811	0.927
		0.688	0.388	0.337	0.362	0.403	0.442	0.604	0.819	0.932
		0.813	0.425	0.375	0.395	0.433	0.469	0.623	0.829	0.940
		0.938	0.552	0.479	0.471	0.505	0.538	0.657	0.834	0.937
	2.5	0.063	0.310	0.311	0.353	0.399	0.446	0.610	0.815	0.930
		0.188	0.299	0.305	0.354	0.404	0.454	0.628	0.841	0.953
		0.313	0.297	0.304	0.354	0.406	0.457	0.634	0.847	0.954
		0.438	0.302	0.308	0.359	0.411	0.462	0.640	0.852	0.955
		0.563	0.315	0.321	0.370	0.422	0.472	0.648	0.857	0.959
		0.688	0.339	0.343	0.390	0.440	0.490	0.661	0.866	0.964
		0.813	0.383	0.384	0.428	0.472	0.520	0.681	0.877	0.973
		0.938	0.513	0.491	0.521	0.560	0.594	0.717	0.883	0.970

1.21	1	0.063	*	0.334	0.311	0.339	0.369	0.508	0.719	0.904
		0.188	*	0.313	0.300	0.332	0.366	0.517	0.738	0.873
		0.313	*	0.304	0.294	0.328	0.363	0.519	0.743	0.877
		0.438	*	0.303	0.296	0.331	0.367	0.526	0.751	0.881
		0.563	*	0.310	0.306	0.342	0.379	0.539	0.762	0.886
		0.688	*	0.325	0.329	0.367	0.405	0.565	0.780	0.891
		0.813	*	0.354	0.376	0.415	0.454	0.611	0.810	0.902
		0.938	*	0.548	0.583	0.624	0.649	0.757	0.881	0.933
	1.27	0.063	0.327	0.293	0.323	0.365	0.406	0.562	0.771	0.894
		0.188	0.306	0.278	0.312	0.359	0.404	0.571	0.788	0.911
		0.313	0.301	0.273	0.308	0.355	0.401	0.573	0.792	0.912
		0.438	0.305	0.278	0.313	0.360	0.406	0.580	0.798	0.914
		0.563	0.315	0.291	0.326	0.373	0.420	0.594	0.808	0.918
		0.688	0.332	0.316	0.354	0.402	0.450	0.622	0.826	0.924
		0.813	0.358	0.360	0.407	0.458	0.503	0.671	0.857	0.936
		0.938	0.564	0.594	0.649	0.687	0.728	0.828	0.931	0.969
	1.5	0.063	0.284	0.291	0.340	0.388	0.437	0.603	0.808	0.921
		0.188	0.268	0.277	0.330	0.382	0.434	0.611	0.823	0.936
		0.313	0.267	0.274	0.327	0.379	0.432	0.613	0.825	0.935
		0.438	0.275	0.280	0.332	0.384	0.437	0.620	0.829	0.936
		0.563	0.290	0.296	0.348	0.400	0.452	0.634	0.838	0.938
		0.688	0.314	0.325	0.379	0.432	0.484	0.663	0.856	0.944
		0.813	0.354	0.377	0.438	0.488	0.542	0.714	0.887	0.956
		0.938	0.600	0.633	0.699	0.743	0.781	0.877	0.965	0.991
	2	0.063	0.271	0.305	0.375	0.441	0.494	0.663	0.906	0.952
		0.188	0.256	0.293	0.365	0.434	0.491	0.671	0.870	0.965
		0.313	0.257	0.292	0.362	0.431	0.489	0.673	0.870	0.962
		0.438	0.269	0.301	0.370	0.437	0.494	0.680	0.872	0.960
		0.563	0.289	0.321	0.388	0.455	0.511	0.695	0.880	0.961
		0.688	0.321	0.356	0.425	0.492	0.547	0.725	0.897	0.965
		0.813	0.376	0.417	0.488	0.558	0.612	0.780	0.929	0.976
		0.938	0.671	0.722	0.791	0.843	0.874	0.951	1.008	1.011
	2.5	0.063	0.277	0.325	0.415	0.486	0.544	0.712	0.890	0.973
		0.188	0.264	0.312	0.404	0.478	0.540	0.720	0.905	0.984
		0.313	0.267	0.312	0.401	0.475	0.537	0.720	0.905	0.979
		0.438	0.281	0.323	0.409	0.482	0.543	0.727	0.908	0.976
		0.563	0.304	0.346	0.430	0.501	0.561	0.742	0.916	0.975
		0.688	0.342	0.386	0.471	0.540	0.599	0.773	0.932	0.978
		0.813	0.403	0.456	0.542	0.612	0.670	0.830	0.964	0.989
		0.938	0.738	0.790	0.874	0.918	0.948	1.008	1.042	1.022

3	1	0.063	*	*	*	0.635	0.368	0.356	0.518	0.679
		0.188	*	*	*	0.628	0.374	0.369	0.541	0.706
		0.313	*	*	*	0.610	0.373	0.373	0.549	0.714
		0.438	*	*	*	0.592	0.373	0.375	0.552	0.718
		0.563	*	*	*	0.576	0.374	0.378	0.555	0.720
		0.688	*	*	*	0.562	0.378	0.382	0.557	0.722
		0.813	*	*	*	0.554	0.386	0.386	0.557	0.720
		0.938	*	*	*	0.564	0.403	0.390	0.546	0.701
	1.27	0.063	*	*	1.105	0.361	0.329	0.385	0.574	0.734
		0.188	*	*	1.069	0.366	0.337	0.400	0.599	0.762
		0.313	*	*	0.999	0.365	0.338	0.405	0.606	0.769
		0.438	*	*	0.925	0.365	0.340	0.408	0.610	0.772
		0.563	*	*	0.854	0.368	0.343	0.411	0.613	0.774
		0.688	*	*	0.787	0.374	0.349	0.415	0.615	0.776
		0.813	*	*	0.722	0.385	0.359	0.420	0.616	0.775
		0.938	*	*	0.691	0.410	0.376	0.424	0.604	0.757
	1.5	0.063	*	*	0.418	0.331	0.349	0.412	0.616	0.772
		0.188	*	*	0.419	0.337	0.359	0.428	0.641	0.799
		0.313	*	*	0.414	0.338	0.362	0.433	0.649	0.806
		0.438	*	*	0.412	0.340	0.365	0.436	0.653	0.809
		0.563	*	*	0.413	0.343	0.369	0.440	0.656	0.811
		0.688	*	*	0.420	0.351	0.376	0.444	0.659	0.813
		0.813	*	*	0.435	0.364	0.386	0.450	0.659	0.813
		0.938	*	*	0.472	0.387	0.404	0.456	0.647	0.795
	2	0.063	*	0.626	0.328	0.331	0.352	0.469	0.679	0.830
		0.188	*	0.607	0.332	0.339	0.362	0.486	0.706	0.858
		0.313	*	0.586	0.333	0.341	0.365	0.492	0.714	0.863
		0.438	*	0.571	0.335	0.344	0.368	0.496	0.718	0.865
		0.563	*	0.561	0.340	0.349	0.373	0.500	0.721	0.868
		0.688	*	0.559	0.350	0.357	0.381	0.505	0.724	0.870
		0.813	*	0.571	0.368	0.371	0.393	0.512	0.725	0.871
		0.938	*	0.623	0.402	0.394	0.415	0.519	0.713	0.854
	2.5	0.063	*	0.357	0.326	0.350	0.379	0.516	0.730	0.919
		0.188	*	0.355	0.331	0.358	0.390	0.535	0.758	0.895
		0.313	*	0.353	0.332	0.361	0.394	0.541	0.766	0.900
		0.438	*	0.355	0.335	0.364	0.397	0.545	0.770	0.903
		0.563	*	0.362	0.341	0.370	0.403	0.550	0.773	0.905
		0.688	*	0.376	0.352	0.380	0.411	0.556	0.777	0.907
		0.813	*	0.402	0.371	0.396	0.425	0.563	0.777	0.908
		0.938	*	0.460	0.404	0.426	0.447	0.570	0.765	0.891

* Crack Length outside FEM geometry

a/c			0.3	0.4	0.6	0.8	1	2	5	10
a/t	r/t	z/t	β							
5	1	0.063	*	*	*	*	*	0.298	0.416	0.562
		0.188	*	*	*	*	*	0.294	0.435	0.588
		0.313	*	*	*	*	*	0.292	0.441	0.596
		0.438	*	*	*	*	*	0.293	0.444	0.599
		0.563	*	*	*	*	*	0.296	0.445	0.600
		0.688	*	*	*	*	*	0.303	0.445	0.599
		0.813	*	*	*	*	*	0.312	0.441	0.593
		0.938	*	*	*	*	*	0.403	0.427	0.571
	1.27	0.063	*	*	*	*	1.180	0.334	0.462	0.621
		0.188	*	*	*	*	1.195	0.347	0.483	0.649
		0.313	*	*	*	*	1.161	0.352	0.489	0.656
		0.438	*	*	*	*	1.114	0.353	0.492	0.659
		0.563	*	*	*	*	1.060	0.354	0.493	0.660
		0.688	*	*	*	*	1.004	0.356	0.493	0.659
		0.813	*	*	*	*	0.941	0.355	0.490	0.654
		0.938	*	*	*	*	0.876	0.349	0.474	0.631
	1.5	0.063	*	*	*	*	0.423	0.359	0.501	0.660
		0.188	*	*	*	*	0.434	0.374	0.523	0.688
		0.313	*	*	*	*	0.435	0.379	0.530	0.696
		0.438	*	*	*	*	0.435	0.381	0.533	0.699
		0.563	*	*	*	*	0.436	0.382	0.534	0.700
		0.688	*	*	*	*	0.438	0.383	0.534	0.699
		0.813	*	*	*	*	0.441	0.383	0.531	0.694
		0.938	*	*	*	*	0.441	0.376	0.514	0.670
	2	0.063	*	*	*	0.383	0.334	0.379	0.562	0.723
		0.188	*	*	*	0.394	0.345	0.395	0.587	0.753
		0.313	*	*	*	0.396	0.349	0.399	0.594	0.761
		0.438	*	*	*	0.397	0.350	0.402	0.597	0.764
		0.563	*	*	*	0.399	0.352	0.404	0.599	0.765
		0.688	*	*	*	0.402	0.355	0.405	0.599	0.765
		0.813	*	*	*	0.408	0.359	0.405	0.595	0.759
		0.938	*	*	*	0.413	0.360	0.399	0.577	0.734
	2.5	0.063	*	*	0.419	0.333	0.332	0.414	0.618	0.773
		0.188	*	*	0.429	0.344	0.344	0.431	0.644	0.804
		0.313	*	*	0.430	0.347	0.347	0.436	0.652	0.812
		0.438	*	*	0.431	0.349	0.349	0.439	0.655	0.816
		0.563	*	*	0.433	0.351	0.352	0.441	0.656	0.817
		0.688	*	*	0.439	0.356	0.355	0.443	0.656	0.816
		0.813	*	*	0.447	0.361	0.359	0.443	0.652	0.810
		0.938	*	*	0.458	0.365	0.359	0.438	0.633	0.784

* Crack Length outside FEM geometry